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In the July issue of Nature Magazine in this department we made various suggestions in connection with photographing the total solar eclipse that will take place the last day of August in an area that is described in detail on Pages 81 to 83 of this issue. Since this outstanding astronomical event is far from being a frequent opportunity, and since some of our readers may have missed last month's article, we are passing along the actual experiences of one amateur photographer for the benefit of others. Mr. Farmer's article should be helpful.

• • •

Any Amateur Can Photograph the Sun's Eclipse

BY COLIN S. FARMER

The solar eclipse of August 31 will, no doubt, tempt a great number of camera enthusiasts to ask the question: "Can an amateur like myself take a picture of an eclipse with an ordinary camera?" That is a question I was asking myself prior to the eclipse of January, 1925, when the path of totality included so many cities in the United States and Canada. Unfortunately a cloudy sky obscured the sun at the time of that eclipse in Toronto where I was hoping to observe it and my ambition to photograph a total eclipse with an ordinary camera was not realized. I had to be satisfied with a photo of the crescent-shaped sun as it appeared through a rift in the clouds about ten minutes after totality.

But on April 28, 1930, the eclipse which passed as a total and as an annular eclipse over parts of the western States and Canada occurred on a delightfully clear afternoon for observers in Toronto, Canada, as a partial eclipse. This led me to try out an experiment that I had been thinking about for some time. I decided to try to get a series of pictures all on the same negative, to show the progress of the eclipse from beginning to end. The problem was to make the blue sky remain as a dark background in spite of a number of exposures and at the same time to make the more brilliant sun stand out white against it. I reasoned that the intense light of the sun would require only an infinitely short exposure, and I hoped that it would be possible to make that exposure so short that the blue sky would have little or no effect on the film.

To reduce to a minimum the amount of light received on each exposure, I inserted between the lenses of the camera a piece of brown cardboard with a round aperture in the centre about one sixteenth of an inch in diameter. To further reduce the amount of light reaching the film, I set the shutter speed at one five-hundredth of a second. For a camera incapable of this high speed exposure, a yellow filter placed before the lens would sufficiently reduce the exposure to keep the sky dark and at the same time make the sun brilliantly white. At the time of totality, the exposure would need to be increased in order to show the corona. Using the same pinhole aperture,

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A series of eight photographs of the solar eclipse of April 28, 1930, as seen from Toronto, Canada. All these were photographed on the same negative by Mr. Farmer.

an exposure of 10 to 15 seconds would show the inner, brighter corona, while it would require from 30 seconds to one minute to record the outer, fainter part of the corona.

It was a simple matter, with the aid of a ground glass focussing screen in the camera, to make the pictures in approximately a straight line and to place them at about an equal distance apart. Before the eclipse began, I took a piece of paper the length of the ground glass and a little more than half its width, marked it off with seven lines at equal distances apart and placed it against the ground glass of the camera. When the eclipse began, I set up the camera with the sun focussed at the edge of the paper at the end of the first line and made the first exposure at 3:26 P. M., Daylight Saving Time. The other exposures were made at intervals of about twenty minutes until 5:20 P. M., when the moon's disc passed off the face of the sun. The larger picture at the right of the illustration was made at 4:19 P. M. when the eclipse reached its maximum. The greater size was merely a result of extending the camera lens out farther, the very small lens aperture giving great depth of focus.

May a large number of camera enthusiasts have the satisfaction of taking a good picture of the coming eclipse.

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COURTESY AMERICAN-SWEDISH NEWS

A spruce growing near Nevekvarn, Sweden, with a perfect spiral half way between the roots and the lower branches.

One of the greatest attributes of the camera is its ability to record the strange and unusual and to make a permanent record. One might tell friends, for example, about the tree one saw on a recent trip to Sweden and how Nature seemed to have twisted it about her finger. So odd is the growth, however, that one's friends would find it hard to visualize the tree. But if the picture could be turned to in the album of pictures taken on one's trip, one would have ample proof that he was not seeing things.

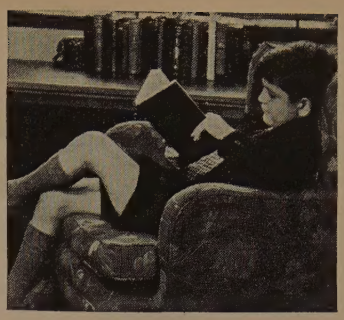
The watchful eye, wherever one may be travelling, will spy out all sorts of things that are different; things that lend themselves to photographing and warrant the use of the negative just as a matter of recording the curious. Some day, when things permit an appropriation for the purpose, we would like to run a photographic contest with awards for oddest subjects pictured. Perhaps that will be our next contest.

Photographic Contest

"To stimulate interest in trees as a characteristic feature of the California landscape, and to encourage their preservation; to perpetuate through outstanding examples of photographic art something of the beauty and spiritual appeal of trees, whether standing as individuals or massed in forests" is the purpose of a Photographic Competition to be held under the joint auspices of The California Conservation Committee of The Garden Club of America and the Save-the-Redwoods League. Prizes ranging down from $100 are to be awarded. The contest is open to amateurs and professionals, but the photographs must be of trees growing in California. The contest closes September 7 and information may be obtained by addressing California Tree Photographic Competition, M. H. de Young Memorial Museum, Golden Gate Park, San Francisco, California.

Pepper Tree

In March we reported a pepper tree that claimed honors as "the largest". Now Alice Featherstone of Ontario, California, reports one on her place that, despite frequent trimmings, is 19 feet, 3 inches around at the ground and 14 feet, 6 inches, six feet from the ground. The tree has a height of about 75 feet and a spread of like dimension. It is forty-four years old.



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YOUR OUTDOORS—AND MINE!

• • •

RESPECT FOR THE RIGHTS OF OTHERS, A GREAT NEED

We were following a trail in Glacier National Park and came to a fork. One of our party had fallen back to photograph a water ouzel bobbing about beneath his water fall. So, to direct him, we took out an envelope, scribbled a note telling him that we had taken the left trail, and stuck it on a stick in the middle of the path.

Four days later we were standing on a mountain peak looking down on Sperry Glacier, and out and beyond at a jagged glory of peaks and shimmering glacial lakes. From his pocket our friend took the envelope. He looked at it with a smile.

"You know," he said, "here's that note you left for me. With all outdoors around me, I've been carrying it around for four days looking for a place to throw it away."

He stuffed the paper back in his pocket. This mountain peak, ten thousand feet above the sea, visited each season by only a handful of climbers, was not the place where one tossed away a crumpled envelope. No more was the trailside or the shore of the sparkling lake or the rim-rock at the glacier's crystal edge. And a few days later when we left the Park the envelope still rested in his pocket.

Now why was there no place to throw away that paper? Here was this man in a great national park. As a citizen and a taxpayer he contributed toward the maintenance of this glorious playground. He was told that it was his park; that he, through his chosen political spokesmen, had set it aside for himself, his children and his children's children. Surely, with this personal interest in this place where he was enjoying a holiday, it was his right to crumple a piece of paper and toss it carelessly away! In doing so he would merely be exercising his rights as part owner.

But he didn't throw the paper away because, as part owner, he recognized the rights of others. Deeper than that, he knew that this bit of waste did not belong there any more than did the initials of the moron scratched on a rock or cut in a tree. Because here Nature had created a thing of surpassing majesty and beauty, this park had been set aside. To be sure he was one of those for whom it had been preserved, but, instead of being invested with rights, this man knew that he had been given responsibilities. It was his duty to aid in keeping undefiled that which Nature had fashioned and man sought to protect.

This is a true, rare and, perhaps, extreme incident. It represents a viewpoint, however, that the American people perhaps more than any others in the world need to acquire. The esthete and sentimentalist is more often than not the object of amusement if not derision. He is laughed at if he prefers a naturally beautiful rural landscape to one partially obscured by billboards; he is impractical if he refuses to buy gasoline at an ugly rural filling station because he feels it an eyesore; he is a "nut" if he expresses disgust at seeing carloads of Sunday tourists homeward bound with bunches of fading wild flowers clutched in grimy hands; he is a reformer if he advocates regulation of the camper and picnicker whose ideas about the rights of others are nil.

No people in the world is endowed with the wealth and variety of beauty that has been vouchsafed the people of the United States. None has the opportunity for play that is afforded our people, whether the play be on playground, on state reservation or in national park. But there is no excuse for an adult to destroy his playthings; to despoil his playground; to mar the beauty that is the heritage of all. There is no pardon for the match carelessly thrown aside in the forest; for the campfire left unextinguished; for the remains of the picnic left to clutter the lunching spot; for the careless disregard for the enjoyment of those to come that is so sadly typical of such a large element of our people when they fare forth for playtime. And the growing body of those who love, appreciate and protect the beauty of the outdoors will not much longer excuse the wasteful, thoughtless vandal.

THE MULE DEER

(See Article on Page 61)

NATURE MAGAZINE

VOLUME 20 AUGUST · 1932 NUMBER 2

THE SECRET OF THE RAVINE

BY HERBERT RAVENEL SASS

ILLUSTRATED BY R. BRUCE HORSFALL

I HAD climbed the green hill above the valley and had come nearly to the edge of the high woods; there for a while I rested, gazing out over the sunny meadowlands below me toward the blue mountains beyond. But I could not remain there long. Something deep in my spirit was discontented. What this thing was I did not know, but I was glad that it was still alive. Long ago it had whispered to me of mystery beyond the next hilltop, of beauty beyond the horizon. It was the sweetest of all voices and it thrilled me as no other voice could.

So I waited only a little while on the hillside above the sunny valley where field sparrows were singing and flocks of goldfinches moved back and forth in undulating flight, sprinkling the air with happiness as they passed. Presently I rose and moved on up the hill past the place where the meadows ended and the woods began. There a narrow trail entered the forest, following the edge of a dark, cool ravine, dense with rhododendron, winding far into the hills. I had never explored the ravine to its beginning and I did not know where it would lead; and now I said to myself that I would follow it to its head and discover its secret.

That it had a secret was certain. All dim, beautiful, unknown woodland places have them, and somehow I knew that the secret of this place, which seemed the very abode of mystery, would be worth finding out.

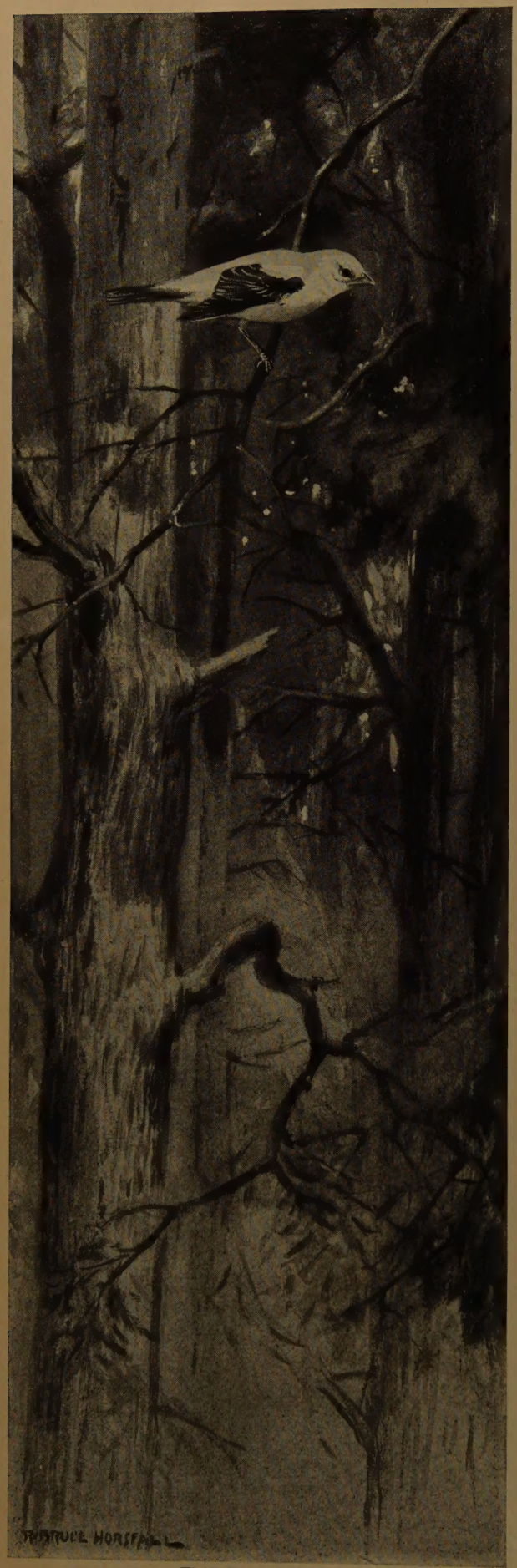
For a long while, however, it eluded me; and, after a time, as I walked deeper and deeper into the woods, I forgot this definite object of my quest and was lost in a kind of dream. The majesty of the mighty trees became in my mind an actual Presence—a Presence unseen but so vividly felt that every particle of my being seemed aware of it, as though it pressed upon me from every side. It seemed to be watching me, watching every step, every movement, lest in some way I do injury to the utterly perfect beauty which it guarded. I knew that nothing here must be touched or changed—that the smallest of those million leaves, the slenderest filament of emerald moss, the most delicate tint of sunlight on the shadowed ground was essential to that high and sacred loveliness. So strong was this feeling that I stopped and stood motionless. A movement, I felt, would be fatal, and equally fatal would be a sound.

Then suddenly, as I waited, a sound rang out—a loud, wild, far-carrying cry, piercing the silence like a javelin.

It startled and almost frightened me, but its effect was not what I had anticipated. It did not shatter the spell. In its wildness and trumpet-like quality there was an indefinable element that harmonized with the spirit of the place so that this loud voice, crying out suddenly from

• • •

In this little essay Mr. Sass suggests again that indefinable something, that elusive quality of Nature understanding that was described by Dallas Lore Sharp as the Master Word. As intangible as will-o-the-wisp, as subtle as a baffling unknown odor, it defies definition. Mr. Sass has, we feel, explained it well as a faculty that has been shut off by city walls. It is a perfect strain of soft melody torn by the discords of our life of today.



THE TANAGER

the dim woods on the farther slope of the ravine, seemed the authentic voice of the wilderness.

I knew instantly what it was. It was the cry of the great pileated woodpecker or logcock, the largest of our woodpeckers now that the giant ivory-bill has vanished, and in most regions the rarest of them all. I could not see the bird, yet its presence thrilled me, and, invisible though it was, my mind was filled with a sense of color, of brilliant scarlet blazing like fire in the woods. I realized then that, after all, something had been lacking in the beauty of the forest. One thing more was needed—some intense and vivid shape of life; and with that sense of scarlet in my mind, I was conscious of a sharp, swift desire to see in the dark, lustrous greenness of that spot a flame-like bird that I had seen only rarely in the woods —a scarlet tanager.

It was a strange thing, the sudden birth of that desire. The cry of a logcock had created a color in my mind, the scarlet color of the logcock's crest, and out of this had somehow been born a longing to see another and very different bird, a tanager. But there was little likelihood of seeing a tanager that day, and, still standing motionless, I began to search with my eyes the part of the woods from which the cry of the logcock had come.

Suddenly my search was rewarded. Directly in front of me across the ravine a brilliant red spot appeared close to the trunk of a hemlock. It was partly screened by a chestnut bough, but I felt sure that this red spot must be the crested head of the logcock thrust out from behind the hemlock trunk. Then, as I watched it, the red spot moved so that the chestnut leaves no longer screened it; and there before me was not the logcock that I expected to see but a splendid male scarlet tanager.

I saw him only for a moment, and he did nothing remarkable, remaining motionless on his twig and uttering no sound. So strangely had he come, as though in answer to that unspoken desire born so mysteriously of a sense of color unseen but vividly realized—a sense of color begotten by a *sound*—that amazement obliterated every other emotion. But, mingled with this and quickly mastering it, was a feeling of fulfilment as though some ardently hoped-for event had come to pass.

It was not only that the inner voice had spoken truth; an even greater thing was the perfection of beauty that had now been attained. For now life had come, the intense and vivid shape of life that I had longed for; and the majesty of the woods seemed somehow mightier because in the dark green heart of the forest blazed this scarlet flame-like bird.

Just for an instant he blazed there; then, as suddenly as he had appeared, he vanished, dropping from his perch into the thick foliage below. Sometimes, remembering how strangely he came, I have actually found myself wondering whether he was a bird of flesh and blood. What, after all, do we know about those woods-spirits in whom the Indians believed—we who live, most of us, in cities far from the green solitudes where, if they exist at all, the woods-spirits must dwell? They are only myths to us, but we can never know the woods as the

Indians knew them; and even we, strangers, aliens in the forest, feel sometimes Presences, mysterious Powers near at hand.

So in my heart I am not quite sure about that tanager of the ravine. He was there beyond all doubt; I saw him. But what made him come just when he did as though I had spoken my wish aloud and the forest had understood? An Indian would have known that this was no bird at all but a being called into momentary life by the Spirit of that forest, shown to me for an instant and then drawn back into the mystery whence he came. But we, who have built our great cities so that we can live in their clangor and never know solitude and never be obliged to think or even to dream because we have so much business and so many amusements to occupy us and are never out of hearing of one another's voices from one day's end to the next—we know, of course, that most of what the Indians believed was nonsense.

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Probably Herbert Ravenel Sass needs no introduction to those who enjoy writers on Nature, but we asked him to tell us a bit about himself and the country about which he likes most to write. And the following is what he tells us:

"I was born and have lived all my life in Charleston, which was, and still is, the capital of that famous Carolinian plantation country where, before the Confederate War ended an epoch, the life of the Old South reached a development equal to and yet quite different from that of Tidewater Virginia. The enchantment of a glamourous past is still spread over all this region —the Low-Country, as it is called; for modern industry has not transformed it or effaced the traces of the past; and for the naturalist the Low-Country is a paradise with its vast tracts of wild woodland, its many swamps, its wide marshes and lonely beaches, its beautiful cypress lagoons (many of them old 'reserves' of the rice-planting days). In this region, so rich in interest for both the lover of history and the lover of natural beauty, most of my work has been done. It is my home and the home of generations of my people before me, and, like all true Low-Countrymen, I love it with a very deep love; but I love also, though not so profoundly, the beautiful Carolinian mountain country where this little adventure with a scarlet tanager took place, so that I have written a good deal about that mountain country, too, and its birds, and the Indians who used to live there when it was even more beautiful than it is now."

THE LOGCOCK

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On the cover of this issue of Nature Magazine is a reproduction of a painting of a red fox by R. Bruce Horsfall. This cover anticipates the fascinating leading story in the September issue—the story of Pixie, red fox pet, by Eleanor B. Pack. Other features in the coming issue include a story of collecting frogs in Surinam by Dr. Mann, director of the National Zoological Park; an article on migrating butterflies; the story of an interesting peacock; the birthstone article of the month and several other entertaining stories from the pens of Dorothy Pletcher, Ben Hur Lampman, L. W. Brownell and El Comancho.

HAVE YOU EVER MET ANY OF THESE FELLOWS WHEN IN SWIMMING?
No? Well, you probably wouldn't recognize them. At the left we have a full-grown Copepod. In the center is no less than Zoea or young crab, and the chap at the right is the Nauplius stage of a barnacle. The little dots or drawings show how big these fellows really are

THE WATER YOU SWIM IN

BY PAUL GRISWOLD HOWES

ILLUSTRATIONS BY THE AUTHOR

WHEN summer comes millions of people flock to the lakes and the beaches, while in winter they throng the southern shores, because the human race loves water. We love to bathe and we know the water intimately, at least most of us believe we do. But how many swimmers, how many boatmen, how many fishermen, realize that the waters of the world are crammed with countless millions of tiny living organisms, minute creatures that often exhibit grotesque or terrifying forms and expressions when viewed through a powerful microscope?

These tiny things are as thick in water as dust is in the air! In summer when bathers are most numerous so are these things at the zenith of their life cycles. A single swimmer might take in a hundred or a thousand of them in a single mouthful of water; yet they are absolutely harmless. They have always been swarming in the sea. We drink them too, many times, in the water from lakes and reservoirs and they may even occasionally be the cause of a change, in taste or color, in water that is perfectly safe. In fact, they are in almost all water and their being there is of great value.

To procure them for closer study in the laboratory, a special net is necessary. It is made of silk bolting cloth which may be obtained in several very fine meshes, known as 0, 6, 12, and 20 gauge. 0 gauge has thirty-eight meshes to the square inch, but the higher numbers possess greater quantities, until when 20 gauge is reached we have one hundred and seventy-three meshes to the square inch.

The net is cone-shaped, three feet long and ten inches in diameter. The ring of the net is of bronze, and three bronze wires lead from the ring to a swivel and towing line. A strainer of bolting cloth is fastened over the net's mouth to prevent large objects entering it. At the small end of the net is an opening which may be closed by means of tapes. The whole thing is thrown out behind a boat and towed at three or four miles an hour.

Upon examination, after a short drag close to the surface of the water, a small lump of jelly-like material will be found at the apex of the cone. It is greenish or sometimes

LIKE ANCHORS AND DECKPLATES OF FAIRY SHIPS
Enormously enlarged photomicrograph of what comes from the outer covering of Synapta, a "sea cucumber"

AND HERE ARE SOME MORE CATCHES FROM THE PLANKTON NET

The peculiar chap left is Pluteus, a stage of starfish. Then we have two eggs of fishes showing embryos upon the yolks. Next Noctiluca, the protozoan in sea water that causes phosphorescence. Finally a couple of Spionids, larvae of a marine worm

pink, and might easily be mistaken for a small jellyfish.

The tapes are untied and the end of the net plunged into a jar of sea water and shaken out, and now a remarkable thing happens. The mass of jelly melts away and spreads out, like pale rolling vapor. It clouds the solution considerably, because here in this mass were really myriads of those tiny entities which we call Plankton, the stuff upon which countless greater creatures are directly or indirectly dependent for their existence.

Plankton includes the minute, wandering, passively floating or weak-swimming creatures that crowd all the waters; those all but microscopic plants and animals, their spores and eggs and larvae, that often color water by their numbers, that build land masses with their countless sunken shells and stand second to none in the economy of the seas, for without them other creatures would die.

Look closely some day at the water in summer when the sun is shining brightly and no wind ruffles the surface. You will see that the liquid is actually not clear but filled with minute specks of things that reflect the light like motes carried through a sunbeam in the air. This is the Plankton and no man may estimate their fabulous numbers.

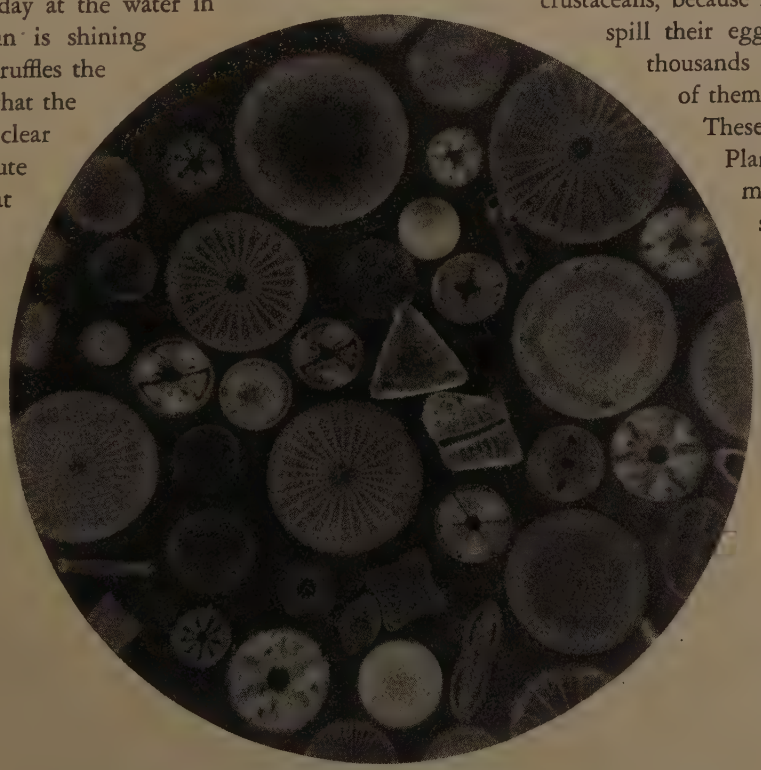
Under the microscope a drop of this "tow" reveals a new and startling world. The uninitiate would find it hard to realize that his eyes were not lying; much less would he connect many of these organisms with their mature, easily visible and more familiar forms.

Youthful crabs, known as *Zoea* or *Megalops,* are nightmare creatures with horns and beaks and bulging eyes. Young sea worms dart about like agitated, bristle-covered seeds, while young starfish resemble the darts in a game of Badminton. Diatoms and Peridians are still more remarkable forms in highly colored casings and elaborate arrangements of spines and glassy spicules, of chains and threads and luminous beads, and all the inexplicable, transparent wherewithal that goes to make these atoms live and breathe and grow and reproduce in their world so far removed in its relationships and balance from the one in which human beings must dwell.

In the Plankton net we find young barnacles, free-swimming and utterly unlike the older ones in their stationary cases of lime. There are hundreds of tiny eggs, also, some of fishes, others of mollusks, worms or crustaceans, because many of these simply spill their eggs into the waters in thousands and chance takes care of them as best it can.

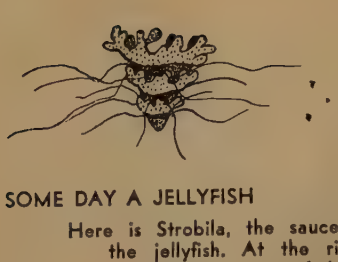
These minute eggs are Plankton also, and it is a marvelous sight to observe the flicker of hearts that are infinitely small or watch the pulse of fluid life through their transparent shells, with the modern projecting microscope.

Plankton is seasonal. A net dragged in February in the vicinity of New York or Boston would contain a meagre catch. In Long Island Sound for instance, or during the same months in one of



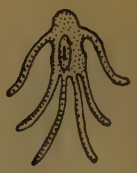
AND HERE SOME INSPIRATION FOR DESIGNERS

Greatly enlarged photomicrograph of diatoms showing the truly beautiful forms of their shells



SOME DAY A JELLYFISH

Here is Strobila, the saucer stage of the jellyfish. At the right is the Nauplius stage of the Copepod



URCHIN OF THE SEA

At an early age, to be sure. At the left we introduce a whiskered youth some day to be a marine worm

the Great Lakes, one would encounter the "Arctic Night" of Planktondom. At this time of the year sunlight is comparatively scarce and feeble, and sunlight and warmth are essential to the life and growth of these tiny organisms just as they are to so many higher animals and plants.

In March and April the awakening occurs, not only in Long Island Sound, but in the Atlantic as well, because by this time inorganic compounds of nitrogen, silica and phosphates have accumulated in such quantities since the death surge of the previous autumn, that there is now sufficient food and building material again, and by May the sun has become warm enough to support the great spring awakening. With the lengthening days and the increased radiation the processes are greatly stimulated.

Diatoms, those single-celled plants with beautiful silica shells, are first to swarm the waters in this vernal outburst. Almost at once they are followed by countless larvae that have hatched from the free eggs of crabs and mollusks, worms and starfishes and barnacles and all the hundreds of their kind. Many of these turn upon the diatoms and devour them.

In June and July the cycle moves toward completion and the diatoms die in billions because of the depleted inorganic compounds so laboriously built up by Nature during the winter months.

The scene changes once more in late July, and pink creatures called Copepods, with bristly feelers and legs, fill the stage so lately swarming with diatoms. The water teems with creatures that are not dependent upon the diatom army because there is now plenty of animal food.

The miracle goes on. *Noctiluca,* the creature that causes phosphorescence, marches its vast legions into this crowded marine world and now by night the slightest agitation of the water brings a glow of heatless light, like showers of greenish sparks issuing in some mysterious manner from their microscopic bodies. An oar pulled through the Sound water in August at night leaves a trail like a meteor; a bather becomes a glowing, spirit-like thing! Who understands why?

As autumn approaches, diatoms sometimes show sudden increases, but they are of short duration. They are but dying gasps that will not serve to revive the race just now. The solar rays grow weaker and weaker again. The fewer the hours of sunlight, the poorer chance has such delicate life as this to survive and carry on successfully. With winter just around the corner, the tide of battle turns against the world of Plankton in earnest, and, by November, there is little to be found on the surface of the waters.

What the bather or the boatman seldom realizes is the vast importance of the Plankton organisms. It is astonishing that such myriad life swims all about one in summer, and while most of it is comparable to dust in the air, at least in size, unlike dust it forms the basis of the food and the substance of life of a great ring of living creatures.

Plankton is the main food material of young fishes. Its tiniest forms are devoured by larger ones, and these by still others, and these by the baby fishes.

The larger fishes feed upon the smaller ones to a great extent, or upon other creatures dependent upon Plankton themselves. Many sea birds and mammals such as porpoises and dolphins and seals are dependent upon larger fishes also, and finally we come to mankind consuming enormous quantities of fish all over the world, and it is safe to say that this would be impossible were it not for the microscopic life that inhabits the waters of the earth, that strange minute stuff called Plankton!

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In the July issue of Nature Magazine was inaugurated a new section of the magazine devoted to the interests of the younger members of the family. The title of this department is "Nature Rambles with Uncle Dick", and the second appearance of the department is made in this issue. We should be interested to have any opinions of our readers with respect to this feature, or any suggestions that they might care to make as to the character of material and the conduct of this department. Just drop a line to Uncle Dick.

BLACKTAIL DEER OF HARDY ISLAND, NEAR THE BRITISH COLUMBIA MAINLAND

PHOTOGRAPH BY ARTHUR NEWTON PACK

A considerable herd roams the thick forest of this island and is the particular charge of its caretaker, Tom Brazil

BLACKTAIL AND MULE DEER

ATTRACTIVE HORNED MAMMALS OF WESTERN NORTH AMERICA

BY VERNON BAILEY

CHIEF FIELD NATURALIST, U. S. BIOLOGICAL SURVEY

WITH A FRONTISPIECE BY R. BRUCE HORSFALL

This is another article in the group written by Mr. Bailey especially for Nature Magazine. Through this series valuable information bearing upon the habits and habitat of our outstanding American mammals is assembled in permanent form.

THE wild deer of the world are among the most abundant, widespread, and valuable of big game animals. They include the moose, elk, red deer, caribou, reindeer, mule deer, blacktail and whitetail deer, and many smaller kinds down to the little hornless musk deer and water deer no larger than big rabbits. The distinguishing characters of the deer family are generally hard deciduous antlers, solid bony growths for use in fighting, which are shed once a year after the mating season is over and slowly renewed before another season begins. Usually only the males have antlers but in a few cases the females also have small antlers and in a few of the smaller species there are no antlers in either sex.

A CURIOUS WILD FRIENDSHIP

The rabbit sleeps close to the old doe at night and follows her all day

Our common North American deer include two groups, the whitetail deer with single beam antlers and long bushy tails and the blacktail group with forked antlers and short tails. Together these deer cover a great part of North America, including practically all of the United States, and in many parts of the country they are still abundant. Their great importance is not due entirely to their numbers and the quantity of delicious food afforded but to their wide distribution and ready adaptation to varied environment, their ability to adapt themselves to conditions of a well-settled country, and

PHOTOGRAPH BY HUGH STEVENS BELL

HEAD OF A MULE DEER OF KAIBAB

One of the herd the proper care and feeding of which has been a considerable problem to officials

even to semi-domestication, and our ability to control their numbers and to perpetuate the species indefinitely in a wild state. Next to our domestic herds they have greater value to man than have any other animals. Still more important to us is the interest, the beauty, the thrill of such graceful animals in our forests and sanctuaries where we come in close touch with the best of our native wild life. The value of such animals to the sportsman is in no way lessened by their esthetic value to the far greater number of people who enjoy seeing them at large in the freedom of the wilderness, and both sportsmen and Nature lovers share in the responsibility of maintaining permanently such numbers of deer as the wilderness areas will support to advantage.

We have no patience with either the hunter who would take more than his share of any game or take it out of season, or who would wound or cripple any animals, nor have we with the purely sentimental attitude that would leave animals to die of old age or of starvation when they have exhausted their natural food supply. Why not give to the native wild life some of the care and study we lavish on domestic animals and utilize in some practical way the surplus on well-stocked public ranges? If we do not exercise intelligent public use and control of the game in this country it will surely disappear or go into private hands as it has in other countries.

The deer have furnished food and clothing to man for thousands of years and are the most easily managed of any wild game. They will continue to be of value and interest if we treat them as we should.

First let us consider the blacktail group. The fork-horned deer include the Columbia blacktail, with two subspecies that range along the Pacific coast from central California to Alaska, and the mule deer with several recognizable subspecies in the Great Plains and Rocky Mountain region of western North America from central British Columbia to central Mexico and reaching the Pacific coast in southern California and Lower California.

The Rocky Mountain mule deer is the largest and handsomest of this group. Old bucks commonly weigh from 200 to 300 pounds and there are records of weights up to 400 pounds. In full-grown bucks the antlers are wide and high and heavy. With their huge ears and great antlers the old bucks are striking animals as they stand facing the observer and no less so as they bound away with heads held high and the white rump patch surrounding the little black-tipped tail showing as a conspicuous directive mark. In winter their coats are dark gray and in summer bright rusty red. The fawns, usually twins, are light brown or fawn color, regularly marked with conspicuous white spots that disappear with the moult in early autumn.

PHOTOGRAPH BY ELVA HARRIS

A NATIONAL PARK FRIEND

Mule deer that enjoy protection soon lose fear

In habits as well as appearance they differ from the whitetailed deer in many ways. They prefer the open country, badland and mountain slopes, open forests or scattered shrubbery where they can see far and watch for danger. In mountain country they migrate regularly from high altitudes where they spend the summers to lower slopes for the winter, avoiding deep snows and keeping always with the best available food supply. Old bucks with velvet-covered horns are often found

FAWN OF A MULE DEER OF KAIBAB

The beauty and charm of deer make them one of the most interesting and loved of mammals

PHOTOGRAPH BY HUGH STEVENS BELL

in midsummer far above timberline on the higher mountains where they are tempted by succulent vegetation and freedom from insect pests, but the does with dappled twin fawns generally keep in the cover of timber lower down.

Their annual migrations afford many advantages in the choice of dainty foods, leaves, buds, and twigs of spicy shrubs and toothsome plants, flowers and ripening seeds, acorns and nuts where available, fruits, mushrooms, and even roots when under the urge of necessity. They rarely eat grass but are fond of all clovers and eat many pungent and bitter plants that are unpleasant to the human taste. They eat also many mushrooms including those most deadly to us, and they keep fat where other animals would starve and only starve where their own food supply has become greatly depleted.

Over much of their original range the Rocky Mountain mule deer have been wiped out or greatly reduced in numbers by unrestricted hunting and natural enemies but within recent years they have been so well protected that in many areas their ranges have become fully stocked and in a few spots overstocked. Their needs are now becoming so well understood that wise plans for their perpetuation are being carried out with gratifying results.

From the Great Plains where they were abundant in the buffalo days they are gone forever, but their destruction there was as inevitable as it was in the case of the buffalo. Both can be saved in wilderness areas that are better adapted to timber and game than to agriculture. Fortunately these areas are extensive in the mountains and rough country and with wise management they will support great numbers of these splendid deer for all time, certainly an opportunity worthy of taking.

CALIFORNIA MULE DEER

Photographed at start of breeding season in Yosemite

The true blacktail deer, including the Columbia blacktail, the California blacktail, and the Sitka deer, which range along the Pacific coast, have the same forked antlers as the mule deer but are much smaller with relatively smaller ears and short, wide, bushy tails that are all dark above and all white below. The metatarsal gland on the outside of each hind leg is only half as long as in the mule deer and is situated about the middle of the metatarsal bone, while in the mule deer it is above the middle and in the whitetail deer still smaller and far below the middle. In fact, many of the characters of the blacktails suggest a compromise of mule deer and whitetail characters and suggest a possible hybrid ancestry of the present type now becoming firmly established into a distinct species or group.

A typical Columbia blacktail buck rarely weighs over 200 pounds and the does are much lighter. The upper surface of the broad bushy tail is mainly black. The California form is slightly larger with larger ears and teeth and also a black top to the tail. The Alaska, or Sitka form is smaller than *columbianus* with light horns and teeth and has the basal half of top of tail brownish gray.

These fine little deer are forest and chaparral dwellers of the coast lowlands and also back in the mountains well up into the big timber of the west slope of the Cascades and northern Sierra Nevadas, and all through the coast ranges from central California to southern Alaska. To some extent they are migratory,

in summer working up the mountain slopes sometimes to timberline and the edge of permanent snow and ice, but in autumn descending before the first deep snows to lower levels, and in Alaska often to the sea beaches to escape the deep snows that would engulf them.

Over most of their range they find a wealth of choice food and good cover and originally they were extremely numerous. In the days of early settlement of the country they were killed at all seasons and in great numbers for meat and for market and at times just for their skins which sold in great numbers for buckskin at a small price.

From the daily bread of the pioneers these deer have now become a luxury to the hunter who can pay the hunting license fee, buy gasoline and make a long journey to some good deer range and bring back his buck for a family feast, and perhaps a fine head with horns to be mounted as a trophy. In most cases it would be cheaper to buy beef or lamb but to those who know the taste of venison the comparison of beef or lamb would be an insult. Just how much of the superior flavor comes from the association of the woods and mountains and from the hunting spirit we may never know, but it seems very real. To those who know good venison it seems desirable beyond any of civilization's choicest viands.

To the great majority of people who have never tasted venison the pleasure of seeing these beautiful deer in the woods and fields and along the highways is worth all that the chase could mean to the most ardent hunter. If sportsmen and nature lovers will work together for the best good of the game and its protection and perpetuation we will have these beautiful animals with us for all time.

The deer have not been thoroughly studied in a systematic way and the following list of North American species with type localities and approximate distribution is about as full and complete as can be given at present. Most of the forms listed are recognizable, but the boundaries of range are more or less hypothetical.

BLACKTAIL AND MULE DEER OF NORTH AMERICA

Map showing approximate ranges of the several forms with type localities indicated by circles

BLACKTAIL AND MULE DEER WITH TYPE LOCALITIES

Odocoileus hemionus hemionus (Rafinesque). PLAINS MULE DEER. 1817. Type from mouth of Big Sioux River, South Dakota. Large with heavy molars.

Odocoileus hemionus macrotis (Say). ROCKY MOUNTAIN MULE DEER. 1825. Type from Mora River, near present town of Mora, New Mexico. Color of body dark gray, face light gray or whitish.

Odocoileus hemionus canus Merriam. GRAY MULE DEER. 1901. Type from Sierra en Media, Chihuahua, Mexico. A small light gray desert form.

Odocoileus hemionus eremicus (Mearns). BURRO DEER. 1897. Type from Sierra Seri, Sonora, Mexico. A light gray desert form.

Odocoileus hemionus californicus (Caton). CALIFORNIA MULE DEER. 1876. Type from Gaviota Pass, 40 miles west of Santa Barbara, California. A small mule deer with black line down top of tail to black tip.

Odocoileus hemionus peninsulae (Lydekker). PENINSULA MULE DEER. 1898. Type from Sierra Laguna, Lower California, Mexico. A small brownish deer with stripe down top of tail.

Odocoileus hemionus cerrosensis Merriam. 1898. Type from Cerros Island off west coast of Lower California. A small deer with dark line along top of tail.

Odocoileus columbianus columbianus (Richardson). COLUMBIA BLACKTAIL. 1829. Type from mouth of Columbia River, Oregon. Smaller than mule deer with wide bushy tail, all dark on upper surface.

Odocoileus columbianus scaphiotus Merriam. CALIFORNIA BLACKTAIL. 1898. Type from Laguna Ranch, Gabilan Range, Benito County, California. Large and pale with larger ears and black-topped tail.

Odocoileus columbianus sitkensis Merriam. SITKA DEER. 1898. Type from Sitka, Alaska. Smaller and darker than *columbianus* with short, brown-topped tail.

PEDES, STEM TO STERN
With all forty of his feet. The centipede is feared without real reason by many otherwise sensible people

PHOTOGRAPHS BY CORNELIA CLARK

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FORTY FEET OF TROUBLE

BY MARY ALICE JONES

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WHILE watching Pedes, my pet centipede, wash six of his twenty pairs of legs one day, it occurred to me that all small boys, during the barefoot season, should thank their lucky stars that they were born bipeds. After a hard day's play, think of having to wash *forty* feet before being allowed to crawl in between cool, clean sheets! Pedes, however, accepts the task with stoical resignation and goes down the line quite uncomplainingly.

Pedes lives in a crystal palace and fares upon the fat of the land but he is as democratic as when he lived under a brown sandstone rock in a hilly country. He was not consulted in the matter of his removal to a wide-mouthed jar on my pantry shelf and such elegance in homes has never "registered" with him. He is annoyed by the slick sides, which prevent his crawling out the top, and it displeases him when he finds that escape lies just beyond his reach when he stands upon the tiptoes of his last ten feet.

Pedes is really a creature of grace and beauty to one who is able to forget the age-old prejudice against his tribe. He is nearly five inches long, not quite as large around as a pencil and the segments of his body are protected by brown plates tipped with black. His "shoulders" and head are covered with reddish-brown armor and the jointed antennae, which are about three-quarters of an inch long, are the same color. At the base of the antennae are tiny black eyes. The plates appear to have been lacquered and the legs and under portions of the body are light tan. It is not an unattractive color scheme at all and admirably worked out to match the surroundings of his native haunts.

Besides being blessed with forty legs, Pedes possesses a pair of finger-like appendages at his posterior end. When he is frightened these appendages are held aloft to strike at an offending object; otherwise, they are usually kept on a level with the legs. They seem to be highly sensitized like the antennae, and feel out the way for their owner.

A FAVORITE POSITION
Pedes curled up on a rock enjoying what passes in centipededom for solid comfort

AN ANT'S-EYE VIEW OF THE UNDER PORTION OF PEDES

Greatly enlarged picture of the centipede's equipment as it would appear if you turned him on his back. Note the poison claws, mouth and antennae

Probably of much more importance to the centipede is the pair of claws situated just back of the jaws. They are modified legs; thicker, curved and ending in black-tipped, needle-like points. These are the venom-carrying instruments that administer the "anesthetic" to the prey, paralyzing it so it can be devoured with ease. There is, also, a minute pair of "hands", one might call them, that are almost a part of the jaws. These are useful in handling the food and cleaning up afterwards. Then there are the important antennae, which keep him informed about his surroundings.

It was with some misgivings that I offered winter hospitality to Pedes for I feared I might not be able to cater to his appetite. Knowing that his chief item of diet was insects, I wondered if I would be able to supply a substitute during a season when insects were scarce.

Very soon a small, black beetle made the mistake of calling upon us and thinking he might be a tasty morsel for the new pet, I dropped him into the jar. Imagine my surprise when Pedes began to race about in terror, trying to get as far away as possible from the harmless beetle. The insect, finding himself a captive, also became alarmed and there ensued a spirited game of hide-and-seek between the two. After some time, however, the hysterical chase subsided and looking in upon them an hour later, I found the beetle cuddled under the centipede as contented as a well fed kitten. Truly, the lion and the lamb had lain down together!

Such camaraderie led me to conclude that centipedes did not relish beetles and when the good feeling continued to exist the second day, I was certain that the insect had nothing to fear. Upon my visit to the crystal palace the next morning, however, I was compelled to reverse all my deductions and to hunt around for a bit of crêpe to hang on the front door. Where once had been a sleek, plump beetle, only a pair of wing cases remained to tell a sad story.

The next experiment was to place a small piece of moist bread in his jar. This he nibbled during the night, probably to obtain moisture as well as food. A day or two later I gave him some raw liver and, to my delight, he attacked it with great zest. Finally, I discovered that, in his estimation, a first class dinner consisted of a juicy bit of T-bone steak fresh from the market, and henceforth the list of food purchased for my menagerie included, at intervals, T-bone steak for the centipede.

Once I timed Pedes to see how long he would stay at the table. I gave him a piece of steak and he ate continuously for two hours and forty-five minutes. I know, because I sat right beside him all that time to see that he didn't cheat, and all that was left of the food when he had finished were two or three small crumbs which he had overlooked.

His table manners were interesting. He would grasp the meat with his claws and several pairs of legs, often holding it aloft while the rest of the body and legs remained almost motionless. Tearing the fiber with his claws and pulling it out into little peaks, Pedes would sever small portions and devour them completely. With the claws and the minute "hands" he would keep turning the morsel around, exactly as I have seen spiders turn their victims while feeding. When one portion was

consumed, Pedes would tear off another, sometimes almost standing upon his head to do it. At other times the portion of his body employed with the task would be turned completely upon its side, while the unemployed segments and legs would be right-side-up and unmindful of what was going on ahead.

The meal finished, Pedes immediately called for the finger bowl. Tidy and clean, like cats and insects, he always washes his hands and face after eating. On this occasion he began with the claws that had dug, constantly, into the red flesh. The little hands which, apparently, were supplied with invisible combs and brushes, were employed in the cleaning process and were occasionally moistened with the mouth, or themselves cleaned of the minute particles gathered from the claws. Sometimes the tips of the claws were passed through the mouth parts and when that phase of the toilet was over, Pedes washed his face and behind his "ears" and then looked to the cleansing of his antennae. This he accomplished by curving them downward so they could be grasped by the claws. Then he would convey them to the mouth and clean them, segment by segment, from base to tip.

Centipedes are almost universally feared and, like the tarantula, are classed with the deadly rattlesnake by timorous laymen. People tell, with all seriousness, how the feet of the centipede are equipped with poison glands, and how human flesh, wherever touched by its feet, will decay and fall out. They yet believe that even the smallest species are dangerous although scientists maintain that the very large, tropical centipedes are not even *deadly* and that the bite of the northern species is no more painful than the sting of a wasp. So don't fear the centipede.

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THE BLACK IGUANA

BY DR. R. W. SHUFELDT

WHEN a native Haitian refers to any of the big lizards of that country, he calls it an *igoana* or some other name ending with the syllable *ana,* and from this name the Spaniards trace the word "iguana." In certain localities throughout tropical America we find various species of large lizards, and, as a rule, they are all known as iguanas. Furthermore, the name has been adopted by science as a generic name for the group created to contain those species possessing a certain array of definite characters, to differentiate them from other lizards in which these characters do not occur. Some of the large lizards, of genera related to the genus *Iguana,* are likewise called iguanas by laymen.

The typical species to which the name is applied is the tuberculated iguana of the West Indies and South America—a form that may come to be five feet or more in length—which is sometimes seen in our zoological gardens, including the new reptile house in the National Zoological Park in Washington. This is the only species of lizards which bears the scientific name *Iguana.*

In our own United States fauna we have several large lizards that are called iguanas, such as the Cape iguana of Lower California; the desert iguana of the Southwest, and the black iguana, which ranges from the extreme southern boundary of Arizona to Central America. The black representative of the species may often attain a length of some four feet, nearly a yard of which is tail. It is wholly black in color, though its young may be of a brilliant green.

Should it be met with in its native country, it is usually found resting on the lowest limb of some tree to which it can climb, and which will support it comfortably. If the way be clear, it will at once tumble off and dash through the bush or thicket to get away. It will stand before a man or a dog only when cornered, and if not seen, the racket it makes may easily be attributed to the plunging retreat of an alarmed deer. If brought to a stand, however, it at once prepares for an encounter with its enemy, instantly assuming a most ferocious aspect; its powerful jaws are open, its eyes flash, and it sways its tail from side to side, partly in fear and partly with the view of intimidating the man or dog confronting it. Its bite is by no means to be despised, and it is fair to believe that most hunting dogs are aware of this fact, keeping at a respectful distance.

This big lizard is eaten by people in all the countries south of the Mexican border, and it is constantly exposed for sale in the markets; those who have tasted it say it compares quite favorably with chicken. Iguanas are carnivorous and will feed upon any small bird or mammal.

CRICKETS AND THE WEATHER

BY BEN HUR LAMPMAN

ILLUSTRATED BY R. BRUCE HORSFALL

"THEY ARE HAPPIEST THOSE WARM AUTUMNAL NIGHTS WHEN THE SPIRIT OF INDIAN SUMMER PERVADES THE LAND . . ."

In Connecticut the farmers pay close attention to the chirping of crickets, firmly believing that the dapper blackamoors are able forecasters of the weather. When the evening song of the cricket wanes they are apprehensive of frost, and when it ceases they know that it will be prudent to spread blankets over the late tomatoes. On those nights when the crickets are none too blithe the Connecticut farmer sits up late, and listens intently, for he is well aware that if the chirping continues until ten o'clock he need fear no frost. Of course, should they cease to sing, there is really nothing to be done about it, but always there is the satisfaction of knowing what the weather will be.

One astute observer has even devised a system whereby he professes to be able to forecast the temperature within a few degrees. It is based upon the number of chirps a minute the chilled cricket gives forth, for as the falling temperature cools his merriment his singing becomes more intermittent. Smile not, for crickets are peculiarly susceptible to weather changes. They are happiest those warm autumnal nights when the spirit of Indian summer pervades the land and the dog's bark sounds drowsy. Then they fiddle away till the dusk is filled with their tune, and a certain enchantment steals over the listener, and he is soothed to contentment and does not dream of far places. But at a touch of frost—

At the first hint of frost the dancing heart of our blackamoor congeals. On the instant he is decrepit and old and sad, and scarce can drag himself aside to die or hibernate. The limbs that were so nimble at noon, that danced before the bright ophidian eye, that mocked the hoptoad, are stricken with palsy and incertitude. Winter has chilled him to the core. So it may well be that the rural sages, marking this indisposition, have turned the frailty of the cricket to their advantage—and read the weather from it. It would seem, on the whole, less fallible than many other weather signs.

Old wives used to foretell storm from the soot on the kettle. If soot caught fire and burned, as it sometimes did, shuttling redly, they said that rain was certain. What actual correlation there was between the small phenomenon and the sometimes subsequent storm was not shown, but the belief in this sign was wide-spread and sincere. Also they were confident, those grannies of ours, that milk soured before a thunder-storm and so foretold the storm itself. A year or so ago scientists blithely undertook to riddle this ancient prognostication, but with small success. They merely proved that weather conditions favorable to thunder-storms were also favorable to the rapid multiplication of the bacteria that turn milk sour. The laugh was with the old wives, and not on them. The cricket seems even more trustworthy as a weather prophet.

But somehow one recoils from this utilitarian employment of the cricket. It seems taking an advantage of his adversity to read the weather by his plaintive distress. So many chirps for frost, poor fellow—slower and ever slower—until the chirps cease. The very spirit of autumn is muted, and the dead leaves drift above the chip where hides the violinist that made the chipmunk dance.

"THE NEST IS AMONG THE CURIOUS AND WONDERFUL IN BIRD ARCHITECTURE"

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TENANT OF THE MARSH

BY J. DEWEY SOPER

ILLUSTRATED BY
R. BRUCE HORSFALL

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Most of our birds have distinctly curious and interesting ways if we look closely enough. The commoner ones by their frequency and nearness to us have tended in a way to dull our perceptions. In a world of objects so universally lovable as birds the old adage "familiarity breeds contempt," of course, cannot apply, but it might be parodied by "familiarity breeds indifference" to the extent that we are prone, are we not, to look less acutely, though more affectionately, upon old friends than upon strangers?

There are some of our little feathered natives, however, who seem so to pique the fancy with their strange and curious ways that one cannot contemplate them with this careless interest. They not only arrest attention, but hold it. Prominent among these is the long-billed marsh wren. His habitat is so exclusive and withdrawn, so partial and relatively inaccessible that not one in a thousand is aware of his existence. His various habits and manners are no less unusual than his choice of environment. Somewhere on the great evolutional tree he has somehow branched aside from his tuneful relatives, the house and winter wrens, and become planted in a watery world of sedge and cattail. In the transposition he either suffered the loss of a former musical portion of his voice or has since simply acquired one no less peculiar and reedy than his home. Or if all life originally sprang from the water, the long-billed marsh wren has progressed less far than his relatives in the triumphant march of Time. Yet nowhere can we turn to find a bird more uniquely in harmony with its

abode than this little sprite of the reedy marshes.

The long-billed marsh wren, *Telmatodytes palustris,* as a species ranges from the Atlantic to the Pacific and from the Gulf States to the Peace River of Northern Alberta. The form of which I write is the one inhabiting the sloughs and marshes of the Great Plains and prairie districts of the Middle West. In Canada it finds congenial situations from Manitoba to the skirts of the Rockies, and north at least to Peace River—the most northerly distributed of the marsh wrens of the interior.

In Alberta they arrive early in May, becoming common by the middle of the month. They begin nest-building soon after, and incubation is usually commenced by mid-June. During favorable seasons eggs may be found as early as the last week of May and young by June 10, but this is unusual. The marsh wrens seem less methodical in the matter of nidification than some of our common birds whose period of incubation may often be foretold with considerable accuracy.

"A SINGER BREAKS INTO A QUEER OVERTURE— 'CLUP-SIS-SIS-SIS-SIS-SIS-SIS-SIS', THEN VARYING IT"

The nest of the marsh wren is among the more curious and wonderful in bird architecture. It is frequently perfectly globular in shape, built of various coarse sedges, stems and grasses and cunningly suspended to the rushes above the water. The entrance to the nest is by way of a small round hole on one side. The interior is softly and warmly lined with cat-tail down or duck feathers—sometimes with fine grasses. In Alberta, where waterfowl are common, I have found the majority of nests padded with downy feathers, principally of the mallard. The whole structure of this unique nest is marvelous when closely examined. How firmly the diminutive builder has worked and welted the materials into his bulky abode and how strongly it is woven about the stems of the reeds that carry it so safely and blithely in the strongest gale! An inimitable fairy cradle for the young as it rides at anchor with such sinuous ease in the wind. In it is displayed one of Nature's triumphs of instinctive intelligence.

But when we have mentioned the home nest we have but touched the fringe of the subject. In addition to the nest actually used, this species builds several mock nests, all as perfect in design and structure as the real one, with the exception that all of these dummy nests are unlined.

This strange habit has been variously explained. Some contend that the bird does this to mislead its enemies as to the true nest; some that it instinctively fears the rise of water and so successively builds at various heights, repeatedly dissatisfied with its former efforts. Others again believe that the surplus nests are simply an expression of the exuberant energy of the male bird, which must find employment while the female incubates. The number of nests ordinarily observed, if thus originated, would certainly account for a great deal of vigor and animation. But probably only the wren can tell us all his reasons.

In a marsh that I visited near Battle River, Alberta, one day in late June, I found about thirty nests, all in good condition, clustered about in a small area of perhaps four or five hundred square yards. Only four of these bore contents—one had comparatively fresh eggs, the others new-hatched young. A short time before I had examined these nests, or all that were then built, for eggs, but without success.

There is a peculiar fascination in wading about the haunts of these quaint marsh-dwellers. For some moments before one catches a glimpse of the first nest of the colony as he wades through the water, there will rise before him the scattered guttural arias of many singers. It is reedy and tangled and mysterious like the tangles in which they live. By sharp watching, perhaps one will glimpse a wren dashing about in the rushes with its tail rigidly bent forward over its back in the most ridiculous manner. The attitude strikes one mirthfully as singularly absurd. At times they seem to draw themselves up compactly into a ball simulating the lightness of thistledown as it drifts about in the reeds. Over here on one side a singer breaks into a queer overture—"chup-sit-sit-sit-sit-sit-sir"; then, varying it, he says—"Clup-sis-sis-sis-sis-sis-sis". All about, as you enter the precincts of the colony, the strange guttural songs issue spasmodically from the tangles. They employ a great variety of tunes, and what they lack in melody they make up in diversity. Now one sputters "Clup-swiss-swiss-tr-r-r-r-r, clup-clup-clup-sis-sis-sir". It is a delight to stand quietly in the midst of their little settlement and listen intently to their strange, broken ditties. Seldom, however, does one catch a respectable view of the bashful musicians.

In publishing this brief biography of our beloved colleague we must confess that we do so despite protest from him. In fact, we have defied our Consulting Naturalist and have refused him the right to edit adjectives out of the story of his life and his accomplishments.

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A MODERN THOREAU

EDWARD A. PREBLE, FRIEND OF WILD LIFE

BY EVELYN PREBLE WALTER
AND
PAUL F. HANNAH

ILLUSTRATED BY JEX

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IN THE month that Edward A. Preble was two years old, he took his first Nature walk, alone. Today, at the age of sixty, he can still remember many details of that first experience, though he has been taking Nature trips ever since—trips that have led him from Hudson Bay to Texas, from Georgia to Bering Sea. And those woodland footsteps pointed the path from which he has never deviated, and which has brought him to prominence in the scientific and conservation ranks of this continent.

To readers of *Nature Magazine,* if their comments may be judged, Mr. Preble is known as one of the finest Nature writers of the day—keenly alive to the out-of-doors and its beauties, sympathetic toward its wild life, and courageous in its protection. At the Bureau of Biological Survey, where he has risen to the rank of Senior Biologist in his 40 years of service, he is variously called a "rebel" and a "modern Thoreau" because of his ardent love for Nature and his passionate opposition to destruction of wild life. In Canada, he is recognized as an authority on that country's exploration and its natural history.

At the offices of *Nature Magazine,* where he holds title of Consulting Naturalist, he is considered, by office boy and managing editor alike, the fount of all Nature wisdom, the sure detector of all inaccuracies, the "fightin' conservationist", and the only man in the world who can stay up all night answering Nature inquiries without losing his temper.

It would be interesting to know what the birds and animals think of him—for their welfare has been the goal of his life.

To see and hear Mr. Preble is to realize that the appellation of "the modern Thoreau" fits him best. He has a strong frame, and the slight stoop in his shoulders, caused by hard work and by bending over the midnight desk, emphasizes his strength. His head is correspondingly large, with generous nose, firm mouth above a firm chin, and high forehead. Beneath his iron-gray eyebrows peer keen blue eyes, rimmed with crow's-feet acquired in a lifetime passed in sun and storm. His face is deeply tanned, and the lines on it are lines of strength, not of age. When at his desk, with his features in repose, he suggests the philosopher; when talking or in motion, he appears as a fighter who has clear-cut ideas on the nature and goal of his cause.

Mr. Preble has only to murmur a word to disclose his

New England up-bringing, not only in the accent, which is Massachusettian uncontaminated by Bostonese, but in the terse, pithy phrasing. He talks little and his diction is plain and unvarnished. Like many New Englanders, he expresses himself with clarity and utter frankness—sometimes to the consternation of his less candid opponents. He has a fund of dry humor that tempers even his most severe remarks and a quickness in repartee that seldom leaves him outwitted in verbal combat. And when he is speaking or writing of wild life, he can be as poetic as Burroughs or Thoreau.

Chief of his traits is generosity. Back in less prosperous days, when raising a family on a naturalist's salary was a struggle against poverty, even car-fare was sometimes a problem. More than once, when assailed by a beggar on the street, he gave away his last nickel, and walked the four miles to his home. He readily admits that many times he has helped unworthy causes, yet feels that it is better to be deceived by many than to deny aid to one really needy person. Many of his acts of charity will always remain unknown, for only the donees know of his kindnesses.

His generosity is carried to a fault, in fact, for it causes him to neglect his own future. As a close friend of forty years, Vernon Bailey, says, "So unselfish is he that he wastes his time doing little things for others when he might do big things himself." Mr. Bailey believes Mr. Preble is a better naturalist than either Thoreau or Burroughs, and as good a writer and philosopher as either, but he fears that he will never shake loose the shackles of arduous detail to devote himself to the creative work he is capable of doing.

The philosophy of Mr. Preble in part parallels that of Thoreau, and explains much of his life. As did the Sage of Concord, he believes that Nature is the basis of all knowledge and wisdom. It holds the solutions to all problems; it is the source of all peace and happiness. The impingement of urban civilization upon Nature has created an unhealthy situation that breeds most of the ills we have, and has spoiled more than it has created by destroying wild life and wiping out natural beauty. The simple country existence amid all the manifestations of Nature, is, to him, the only perfect one. Yet it is characteristic of the man and the fighting line from which he springs that, believing as he does, he chains himself to a desk in the city to help save the remnant of our natural heritage and to point out its value to mankind.

It is axiomatic among the staff of *Nature Magazine* that "What Mr. Preble doesn't know he knows how to find out." And his knowledge, gleaned from more than fifty years of living with and carefully observing his subject, is unusually great. He has compassed in a general way the entire fields of botany and zoology, although birds and mammals are his special fields, and his wide acquaintance with natural history literature enables him to track down and corner any information desired. He is skillful in preparing specimens, although he has not collected an animal for many years, and an able editor, as his work with *Nature Magazine* and as chairman of the editorial board of the *Journal of Mammalogy* testifies. In short, as Dr. T. S. Palmer, secretary of the A. O. U. and a co-worker, says of him: "He's an all around naturalist." Few of these exist in this day of specialization. Though claiming only the most amateurish knowledge of botany he detected a plant new to the district within ten feet of the porch of the Washington Biologists' Field Club, where botanists had discussed by the hour the local flora. On the Virginia shore, near by, he captured a mammal new to science, a tiny shrew belonging to a genus then unknown to the region, and probably the smallest

THE PREBLE HOME IN WILMINGTON, MASSACHUSETTS

From headquarters he ransacked the surrounding fields and forests for many miles around

DESCENDING THE MIGHTY ATHABASKA

Between 1900 and 1913 Mr. Preble travelled many thousands of miles among Canada's mountains and waterways

mammal in the world. It is surely the smallest in America.

To understand fully Mr. Preble's knowledge of the "Master Word" that binds together the human and animal world, one must go back into New England history to discover, in his ancestry, seeds of love of Nature, and vision his childhood environment where those seeds grew solid roots. For so long that the memory of man runneth not to the contrary, there have been Prebles in New England, and the islands and lakes in Maine and elsewhere that have been named for Prebles attest their importance and position in their communities. Many followed the sea, where man and Nature commune most frequently—of these Commodore Edward Preble, of Frigate *Constitution* and Barbary pirate fame, and others who sailed for whales or fishes; the rest for the most part clung to the soil, and in their natures the grandeur of the out-of-doors left its stamp.

It was of this line that Edward Alexander Preble was born in Somerville, Massachusetts, on June 11, 1871; but he considers that his life really began a year later, when his parents moved to Wilmington. A portion of the territory of this town, which was incorporated in 1730, was considered so remote even at that time as to be termed "the Land of Nod"; and in the last quarter of the nineteenth century it still retained enough of its wildness to be congenial to a boy who always preferred out-doors to in-doors. There were large areas of mixed woodland, and many great groves of white pines, some of them virgin stands. Miles of boggy meadows and swamps, prepared by the successive attacks of the ice sheets and the milder intervals between their visits, afforded suitable homes for many interesting plants and a wealth of birds and other small creatures. There were ponds and streams filled with fishes and turtles and frogs. It was a country neighbor and kindred to that which the genius of Thoreau has made immortal. There, a thousand tongues, in woodland, meadow and swamp, clamored to tell their interesting stories to him who was listening.

Young Edward had additional stimulus from within the home, too, to inspire his Nature enthusiasm. His mother, Marcia Alexander Preble, was a lover of flowers, both cultivated and wild, and had a keen ear for bird-songs; and she and the boy spent many joyous hours together in the field. His father was city-bred, but had known camp-life in the South during the early sixties, and led his oldest son and the younger brothers on woodland trips as soon as they could walk.

As the boy grew up, he spent every spare moment in the woods and meadows, bird-nesting, fishing, trapping, and later, as his strength increased, hunting, wood-chopping, farming, and haying. From the earliest days he closely observed the abundant plant and animal life around him. He came to know the country for many miles around with an unrivaled intimacy, and many a time the puzzled land-owners sought his aid in locating lost or forgotten boundary lines.

The little red school-houses in New England, in those days, were not much like those of today. Edward's earliest was only half a mile away by the road, but there was a shorter way (and many longer ones) through the woods. Later, when the time for high school came, the nearest was in Woburn, four miles distant, but this distance lent enchantment, for his walks to and fro, seldom by the shortest way, were veritable holidays, and undoubtedly contributed more to his education than did the classroom. Then he learned of Caesar's wars, and of the mischief wrought by Helen of Troy, but, as he says, "most of this lore is now happily forgotten." He remembers chiefly that he had to work hard, always at night (for afternoons were better employed), on all his studies except spelling, and today Mr. Preble is the most accurate orthographer on the *Nature Magazine* staff. He recalls

best that his schools taught nothing of Nature, on which all knowledge is based, though there was more of it about than there is today. What of Nature he learned he gained by himself in field and forest.

The young naturalist read eagerly whatever came to hand. Most important was a nearly complete file of *Harper's Magazine*. Books on natural history were scarce. His earliest was Burrough's *Wake Robin* with its appealing message for the country boy. At about the same time Coues' *Birds of the Colorado Valley* came as a gift, and opened his eyes to the vast field of ornithology. But in the pleasant task of learning the names of the smaller birds, Samuels' *Birds of New England,* borrowed at first and later owned, was his surest aid.

On occasional trips to Boston he found his way to the rooms of the Natural History Society, where he studied the mounted specimens through the glass of the cases. His bashfulness kept him from seeking help—he did not then know that the leaders there welcomed alike the scientist, hunter and fisherman, and that the shy country boy would have found a ready explanation of the problems he had been unable to solve—the mysteries of the gravel hills set down in the middle of the swamps, of the balanced boulders, the buried forests and the quaking bogs.

Summer-time meant, for him, a visit to his grandmother's farm in Ossipee, New Hampshire, in the foothills of the White Mountains, and he came to love this country as no other. Each vacation period finds him there today, climbing his favorite summits, roaming his childhood meadows, and gaining inspiration from the image of Chocorua dipping its trident peak into the lake. There is peace, and time for contemplation, and rest for the overworked mind; and he returns with another layer of tan, a renewed vigor and a strengthened determination to save such beauty spots and their wilding inhabitants for posterity.

As two younger brothers had to be raised on a meager income, there was no college education for Edward; instead was a nightmare period spent in a plumbing supply store in Boston, preliminary to a dreaded business career. But no moss grew on the stony pavements over which he carried spigots and lead traps for four dollars a week, and after eight months he went back to the woods, with his aversion for large cities intensified.

No one can say where his steps might have led, but for a fortunate circumstance. A cousin's schoolmate put him in touch with the Department of Agriculture in Washington, where a newly formed division, now the Biological Survey, was just beginning its study of the wild life of North America under the leadership of its founder, Dr. C. Hart Merriam. He was recommended by no less a personage than Frank H. Hitchcock, the then "ornithological clerk" there, later the Postmaster General, and so diligent had been his self-tutelage in Nature and taxidermy that he quickly convinced Merriam of his worth. He was called to Washington in 1892, and went to Oklahoma for field work with Vernon Bailey.

Thus began a period of roving, studying, collecting and observing that slackened only within the past few years, when his many duties have demanded his constant presence in Washington. By 1900 he had traversed the valleys and plains of Texas, the mountains and timberlands of Oregon, Utah and Washington, the little-known coast of British Columbia, and the western shores of Hudson Bay. Most of his journeys were made on foot, on horseback, or by canoe, for there were then no automobiles or scenic highways. Veterans of the Biological Survey who were his companions in those days say that nothing on two legs could outwalk, out-pack or out-paddle him. In 1914 he was sent with Wilfred H. Osgood and George H. Parker on a special commission to study the status of the great herds of fur seals on the Pribilof Islands, in Bering Sea, and the report they made marks an epoch in seal conservation.

One of his most interesting and strenuous trips was by canoe through the Mackenzie region from Great Slave to Great Bear Lake in 1903, through a country almost unknown. Here he had been preceded in 1864 by Père Petitôt, a Catholic missionary zealous alike for exploration and baptism, who had traversed this region on snowshoes and, being its first historian, had given names to the waterways. This courageous priest had erected an axe-hewn cross on a prominent point above a lake which he had called, from the circumstance, Lac St. Croix. No white man had since seen this cross, and geographers had only conjecture to guide them in identifying Petitôt's roughly mapped lakes. While exploring about one of his camping places young Preble happened upon the old cross, fallen and disjointed, but recognizable from the date carved in Roman numerals on the great cross arm. It was only when he had reached Fort Simpson, an old trading post, after traversing Great Bear Lake and ascending the Mackenzie, that he learned of the importance of his discovery, but his carefully-taken notes made it possible to fix the names of all the lakes in the chain named by the priest, though it upset the current notions of many map-

The Lover of Nature

By EDWARD A. PREBLE

TO THE nature lover the universe constantly pours out its wealth. Daily he gathers the fruits of seed sown in the beginning of the world.

For him no season is dull, for each is successively absorbing: In Spring he is entranced by the awakening of myriad forms of life; Summer reveals the maturity of all creation; Autumn brings the fulfillment of earlier promises; Winter lulls life to sleep, with its assurance of the resurrection.

All weathers are one: The rains of Spring nourish all nature; the heats of Summer mature and ripen its fruits; the frosts of Winter give rest and peace; in all he rejoices.

Each day is good: In the morning life awakens with him; through the noon it works; the peace and quiet of evening shed their benediction upon him.

He knows no dull moments; he seeks not to hurry time. If he be delayed, he may discover something never before seen by man, and his impatience is forgotten.

His youth is filled with the joys of discovery; in middle age the marvels about him hold his interest undimmed; he awaits old age with calmness, for he is one with the universe, and is content.

makers. Partly in recognition of this contribution, Canadian geographers have named a large island in Great Slave Lake, touched on in several of his journeys, in his honor.

Another notable trip was a six months' canoe journey, made in 1907, to the Barren Grounds about Aylmer Lake, northeast of Great Slave, with Ernest Thompson Seton. On this expedition they covered more than two thousand miles, and their observations on caribou, wood buffalo, musk-ox, whooping crane, and other rarities, are detailed in Seton's book covering their adventures. A few years later, with two companions, Preble crossed British Columbia, by canoe and on foot, from the coast to Peace River.

Soon after *Nature Magazine* was established in 1923, Mr. Preble was made a member of the Scientific Consulting Board with nine other leading scientists and conservationists, and a little later he became Consulting Naturalist, and began a labor of love that few men would undertake. Every article that appears in *Nature Magazine* he reads repeatedly, checking and rechecking it to insure its accuracy. Nearly every inquiry—and there are hundreds of them each year—crosses his desk, and receives his personal attention. He prepares the semi-annual index, writes frequent articles and revises many others, and in addition contributes editorials and conservation notes. And all this is supplementary to his work at the Biological Survey and as chairman of the editorial board of the *Journal of Mammalogy*. Frequently lights burn to dawn in his study at home, and but for his rugged constitution and those periodic rests in New England he could not keep up the pace.

But he loves his work, for he feels that it is helping to a greater appreciation of and protection to the wild things that form the core of his life. Many men, from St. Francis on, have had as much affection as he for birds and animals; but only a handful have been willing to spend a life-time in a struggle to save them from wanton destruction. The more persecuted a creature, the more vigorously does he champion it; the more maligned, the harder does he work to prove, by scientific fact, its economic or esthetic worth. He is responsible to a considerable degree for changing popular attitudes in favor of the hawks and owls. The woodcock is his special ward, and his blasts against the gunners who are destroying this bird have played their part in remedial legislation. His friends find him inclined to be pessimistic on the progress conservation is making; but that is because he is never willing to compromise with the destroyers, and cannot be satisfied with half-way measures. Trying to represent the viewpoint of the species under discussion, as he always does, it is difficult for him to find progress in the fact that 9,000,000 hunters go forth each fall to harass the pitiful remnants of the game species that are left.

Unlike Thoreau, Mr. Preble is not a bachelor, which is just as well for him. Were it not for his wife and his two daughters, his peculiar attitude toward food, drink and raiment might lead to serious complications. They have to cajole, threaten, tease and entreat to get him to visit a clothing store; and unless they continually argued and implored, the barber shops and hatters would know him not. It seems to be his ambition to establish records for the wearing of the same necktie—an ambition they can only thwart by constant vigilance. It is not that he dresses so shabbily—it is just that he feels that such incidental matters are not important. And many a supper has grown cold on the table while he argued some conservation point with a friend on the corner. One imagines that occasionally they wonder if love of Nature may not be carried too far.

To Mr. Preble, however, this love cannot be over-indulged, for it is the secret of happiness and peace. A number of years ago he penned a few lines entitled "The Nature Lover". These lines, better than any words of others, reveal his beautiful prose style, his character and his philosophy. Some time in the future he hopes to spend long days at his little shack near the Potomac, which he seldom has time to visit during recent years, or on the old New Hampshire farm. If his dreams ever come true, we can expect many more writings from his pen. He has much to say, and given his opportunity, he may yet establish another parallel between himself and Thoreau by creating books posterity will avidly read.

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BURS OF OUR COMMON PLANTS

NO. 6—THE ABUNDANT CLEAVERS OR BEDSTRAW

BY SALOME COMSTOCK-MILLER

Several different plants are called cleavers or bedstraw. All, however, are closely related, and bear a general resemblance to each other. Some kinds have, in addition to burs, prickles on the stem and leaves, so that the whole plant may become entangled in the coat of a passing animal and be carried away. The stem of cleavers is angular, almost square. The burs are produced in pairs, in the axils of the leaves or at the top of the plant. The leaves are usually undivided and are arranged in circles about the stem. Cleavers are found in almost every part of the United States, so easily do they take up travelling.

THE BUCK THAT LOVED MUSIC

BOTH CLASSICS AND JAZZ DREW HIM

BY KENNETH FULLER LEE

I MET Hosea before he was quite dry. His mother was one of a group of fine big does that populated the spruce ridges behind my camp in the Middle Allagash, and she had given birth to Hosea and his twin sister behind a big blowdown just a few hours before I blundered upon them.

It was a delicate matter, this making friends with a pair of newly arrived whitetail deer, especially with the nervous mother snorting and stamping her dainty hoofs a dozen yards away. But finally they grew used to my presence, even allowing me to stroke them gently with the tips of my fingers.

I visited them regularly every few hours, that first day, and the following day they were gone. A few days later the old doe came into our camp yard as quietly as a ghost, bringing both the youngsters with her. We were in the habit of leaving scraps of salted bread where she could find them, and during the summer she continued her visits with the growing fawns usually at her side.

HOSEA AND THE PHONOGRAPH

"All we had to do to call Hosea was to put on a record, and he came bounding from the woods"

Hosea became very tame, and in time would follow Mrs. Lee and me on short trips into the surrounding forests, answering to a whistle exactly as a dog would do. He loved saltines, and we taught him to expect them whenever he heard the blast of the whistle.

Hosea was a splendid swimmer, for a little chap, and when he saw us starting off in the canoe he frequently swam after us for short distances, fairly begging to be taken along on our fishing trips. The other fawn was shyer, and never became really tame.

During the hunting season we kept the little fellow close to camp, to avoid a tragic accident at the hands of some careless hunter, and that winter he stayed near us, frequently coming into the camp yard for his beloved saltines.

The winter was an easy one for the deer, and Hosea emerged in spring looking sleek and handsome, with a pair of tiny horns commencing to sprout. He was tamer than ever, and got to be more or less of a nuisance because of too frequent demands for food.

It was in June that we discovered a curious trait of his. We had a small portable phonograph at the camp, and one day, more for an experiment than for any other reason, I set it up on a block of wood in the yard and started it.

Hosea immediately came running over to see what it was all about. I discreetly retired to the porch, where I could watch the proceedings, my camera ready to record the happenings. Hosea walked suspiciously up to within a few feet of the phonograph, stopping frequently to snort and stamp his feet defiantly at the strange noises issuing from the shining box.

He would cock his head sidewise in the manner of an over-grown police dog, listening to the music with the keenest interest. Once or twice I was afraid he would strike at the phonograph and wreck it, but finally the record ran out and the machine ran on silently until I went over and stopped it.

After this initial experience, we were able to call Hosea into the yard at any time by simply putting the phonograph on the porch and starting it. He did not show any "high-brow" preference for any special type of music, appearing to relish "jazz" fully as much as the works of the famous composers.

But he certainly did like music. There were four or five other deer which commonly visited our yard, and none of them paid the slightest attention to the phonograph, evidently thinking that it was our own voices that they were hearing. This was a sort of compliment, I suppose, if one cares to look at it that way.

We had to stop feeding Hosea in the fall of the second year, as he began to become vicious. But as long as we were at that camp it was only necessary for us to start the little portable if we wanted Hosea to appear. It rarely failed to bring him bounding from the spruces—and he would haunt the porch as long as it continued to play, no matter what the tune or the type of music might be.

BUSILY ENGAGED AT THE PRACTICE OF WASTING TIME IN A MISTAKEN ENDEAVOR TO IMPROVE HIS LAWN

PUTTING LIME ON THE LAWN NOT ONLY DOES NO GOOD BUT IS APT TO INVITE WEEDS THAT THRIVE WITH LIME

DON'T LIME THE LAWN!

BY ALBERT A. HANSEN

SINCE the days of ancient Rome farmers have known that certain crops, such as clover and alfalfa, thrived best on limed land and liming has long been considered as good farm practice.

Naturally, the practice of liming spread to lawn-making, although no one really took the trouble to find out whether lime actually benefited the grass. During the days before the invention of the modern lawn mower animals were largely used to keep the grass clipped. Then the effect of lime was difficult to observe since the manure from the animals served to keep the grass in good condition. For generations we have accepted the practice of liming lawns without question since it was an established custom that, like the taking of spring tonics, no one even thought of questioning. For no good reason it seemed to be quite the thing to do and the return of spring was heralded in city and country with an annual coating of lime on all carefully kept lawns.

One of the unexplainable phenomena of the aftermath of the World War was the sudden popularity in America of the ancient and honorable game of golf. Formerly the game of the favored few, golf spread to the masses and courses developed like mushrooms throughout the length and breadth of the land. Golf, of course, needs turf and the new status of the game created a demand for specific information on turf making beyond the mysterious methods and secret tricks of the expensive imported greenskeepers of exclusive pre-war clubs. Indeed, until recently, practically all of our knowledge of turf making has been based on experience and opinions instead of upon experimental evidence. The new demand, however, resulted in the starting of a great deal of actual experimentation with turf plants on the part of several of the agricultural experiment stations and the United States Department of Agriculture.

We are just beginning to reap the benefits of this work, the results of which have upset many time-honored turf practices. Outstanding has been the discovery that lime on turf, instead of aiding the grass, actually encourages the weeds and represents time and money worse than wasted. For example, on the several hundred plots of the Arlington Turf Garden, the experimental grounds of the United States Department of Agriculture, the limed areas are by far the weediest of the entire series!

A great aid in exposing the worthlessness of lime on turf was the comparatively recent development of the dye indicator test for revealing the *degree* of acidity or alkalinity of the soil. Before this discovery we were practically dependent on the litmus test which merely differentiated between acid, neutral and alkaline soils but gave little indication of the degree of acidity or alkalinity. To illustrate how important this test is in revealing the effect of lime on turf, let us examine its use on a series of experimental plots located near Washington, D. C., that had never been weeded since they were sown four years previously.

In the use of this test the figure PH7 represents a neutral condition of the soil and the farther we get below this figure the greater is the degree of acidity. The near-

Readers desiring copies of the American Nature Association Bulletins on How to Make a Lawn, The Weedless Lawn, The Peony Garden, Care of Your Garden Roses and Planting Your Bulbs should send to the Garden Editor requesting the bulletins by name and send a three cent stamp for each desired.

YARROW AND DANDELION ARE UNWELCOME LAWN VISITORS

Yet these, together with crab grass and the bothersome plantain, prosper well when a lawn is given a liberal liming

est to neutral was a plot that had been limed, the test revealing a PH6.8 value. This plot contained 85 percent of weeds, including crab grass, dandelions, plantain and yarrow. Another plot of PH6.3 value (slightly more acid) contained 80 percent of weeds, a 4.6 plot was 60 percent weedy and so on down the line until the most acid plots of all, testing 4.6 and 3.7, were only 15 percent and 12 percent weedy while the stand of grass was excellent! There must be a limit to the acidity that grass can tolerate but this limit had not been reached on the experimental plots after four years use of acid-reacting fertilizers.

These remarkable results have been substantiated by numerous additional tests, all pointing to the fallacy of adding lime to turf. It was formerly believed that Kentucky bluegrass, our standard lawn plant, would not thrive without lime but the evidence is becoming clearer that bluegrass will do nicely on sour land providing it is given an abundance of plant food. Since there are few lawn weeds that can thrive in sour soil, the obvious thing to do is to invest time and money on fertilizers that stimulate the development of bluegrass instead of on lime that encourages weeds at the expense of the grass.

There is still another angle to this interesting problem. Professor S. D. Connor of the Purdue University Agricultural Experiment Station has demonstrated that in the so-called hard-water sections, which include a large area of the United States, the lime content of the sprinkling water, which is what makes the water "hard", gradually accumulates in the soil and supplies the grass with more lime than it can possibly use. As a matter of fact, even if lime were good for lawns, the sprinkling water in the "hard" section supplies more than is needed, resulting in neutral and alkaline soil that greatly encourages the development of weeds.

The crux of the whole matter is that the time and money now being wasted on liming lawns should be spent on fertilizers instead. The result will be fewer weeds and better grass in the lawns around our homes.

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A DINOSAUR?

BY H. D. WILLEY

No, this is not a picture of a prehistoric dinosaur. It is growing in Greensboro, Vermont, and dinosaurs do not live there.

The picture is of an unusual freak tree. It is a yellow birch, growing thirty inches in diameter from the ground, and at a height of twenty inches becomes horizontal for six feet, then resuming its vertical position.

Another birch tree much smaller has grown six feet from the base of the larger tree, and in a straight line with the horizontal part. This joins the main tree almost at its base. Just adaptation and early defiance of obstacles.

BIRTHSTONES OF AUGUST

BY AUGUST POHNDORF, JR.

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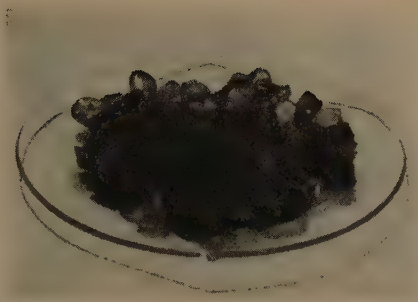
Being the eighth of the series of twelve articles prepared by Mr. Pohndorf on the birthstones that represent each month.



PERIDOT, GEM OF NIGHT
Its true beauty is best seen by artificial light

AUGUST, with her rather unsavory reputation for heat and thunderstorms, has at least two assets besides that of being the vacation month. The two gems in her diadem—the waxy, golden-red sardonyx and the exquisite "Evening Emerald", the peridot—are jewels that hold their rank with the finest in the hierarchy of precious stones, and give the month that calls them her own rare beauty and grace born of their special distinction.

Sardonyx has been one of the most popular of gems since the early Egyptians and Hebrews wore it on their persons and used it in their temples. The Greeks and Romans traveled weary miles to procure it; Crusaders brought it home with them as spoils of war; Medieval Europe wove legends around it and bound it to the hearts of men with gossamer threads of superstition, and even when the Nineteenth Century had stripped it of its rich garment of myth, it still reigned high in popularity.

JEWELRY MADE OF SARDONYX AND PERIDOT
Both of these stones are most attractive and make not too expensive items for adornment

This stone is that form of quartz known as chalcedony. It is hard and waxy, translucent and non-crystalline. It ranges in color from yellow through blood red to a golden red, and this hue seems to have resulted in the modifying of the name cornelian (from the word *corneus*, meaning horny) to carnelian. Because of its lack of fine brilliancy and transparency, it is usually cut flat, convex or dome-shaped to bring out the full color and luster. To facet this gem, in the manner of a diamond, is to dull its effect.

The gem is usually found as rounded boulders or pebbles or in broken fragments, or as a stratum in some other substance such as onyx. India, Palestine, Arabia, Brazil, Uruguay, Saxony, Scotland and Ireland are its principal sources, although it is infrequently found in New Zealand and the United States. It has a hardness of 7, a weight about 2.65 times that of water, and an insolubility which yields only to hydrofluoric acid. Heat does not melt it, but darkens the color of certain varieties.

The name sardonyx has two possible derivatives—either Sardius, in Asia Minor, which is mentioned by Pliny as its source, or the Arabic word "sered", meaning "yellowish" or "yellowish-red". But, though its original title is shrouded in darkness, some of the myths concerning it are not. It was supposed to cure tumors and all wounds made by iron. In the Middle Ages, people gave it the power of bringing success in law-suits and begetting riches, and Epiphanius, a writer of this period, gravely informs that it will cure stomach ills and protect against witchcraft both at the same time.

Ancients used sardonyx both for ornaments and seals. A fine ellipse-shaped cameo, nine inches long and eight inches wide, depicting the "Coronation of Augustus" is one of the most famous of all sardonyx jewels, remarkable both for its size and the complexity and fineness of its carving. Another famous one represents the triumph of Bacchus and Ceres.

The stone is comparatively inexpensive; a few dollars will buy a fine one of good size.

The peridot, that shares with sardonyx the honors of August, is a chrysolite, that is, a highly complicated silicate of magnesium, and contains a dash of chromium, which gives it that delightful green shade for which it is famous. Seen in daylight, it is as mellow as old wine, but it reaches its highest perfection after dark, when the electric lights are turned on. Then it is endowed with a character all its own—an inner life characterized by a sparkling, Puckish twinkle.

This "evening emerald", although comparatively soft (6½ to 7 on Mohs' scale), is of sufficient beauty and rarity to be classed among the first order of semi-precious stones. In brilliancy, it falls a little short of the sapphire, but its double refraction, which gives rise to two images, adds to its unique charm. Fine peridot may cost as much

as ten dollars a carat depending on the market condition.

It is found in disseminated grains and globules in a matrix, occasionally in water-rolled pebbles, and infrequently in crystals. Small impregnations of peridot, in the amorphous state, are frequently found in iron meteorites. A gem that comes from celestial space! Its chief sources are more mundane, however—Ceylon, the Levant, Upper Egypt, the Island of Topazius in the Red Sea, Madagascar, Queensland, Alaska, and the American States of Arizona, Colorado and New Mexico.

To the people of an earlier age, our peridot was topazium, and it was useful to calm the burning thirst of a feverish patient if held under the tongue, and to cure asthma if finely powdered and taken internally. In this age, no one seems to be able to afford such expensive (and such useless) remedies or to believe in them.

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FLOWERS IN LUXURIANT GROWTH AT THE SNOWBANK'S EDGE

This lovely patch of wild flowers was photographed by the author on MacDonald Peak in the Swan Range of Montana

FLOWERS AND SNOW

BY MORTON J. ELROD

ABUNDANT vegetation grows below a snowbank in the mountains. These banks are the result of snow drifted by wind, and accumulated at the expense of some other section of mountain surface. As the snow melts it both evaporates and soaks into the earth below. It may be sufficient merely to moisten the soil, or it may result in a living spring of water.

In any case, there will be more moisture below the snowbank than at other places. This serves the same purpose as rainfall to growing vegetation, which rainfall in summer is usually not heavy. Also, plants may be seen in all stages of growth from full bloom, some distance below the snow, to the first shoots pushing upward through the ice. Plant growth may show spring and summer close together.

In some cases, where snow lies very late, or perhaps during most of the summer, the season of snow absence is too short for plants to grow, and the ground will be quite bare.

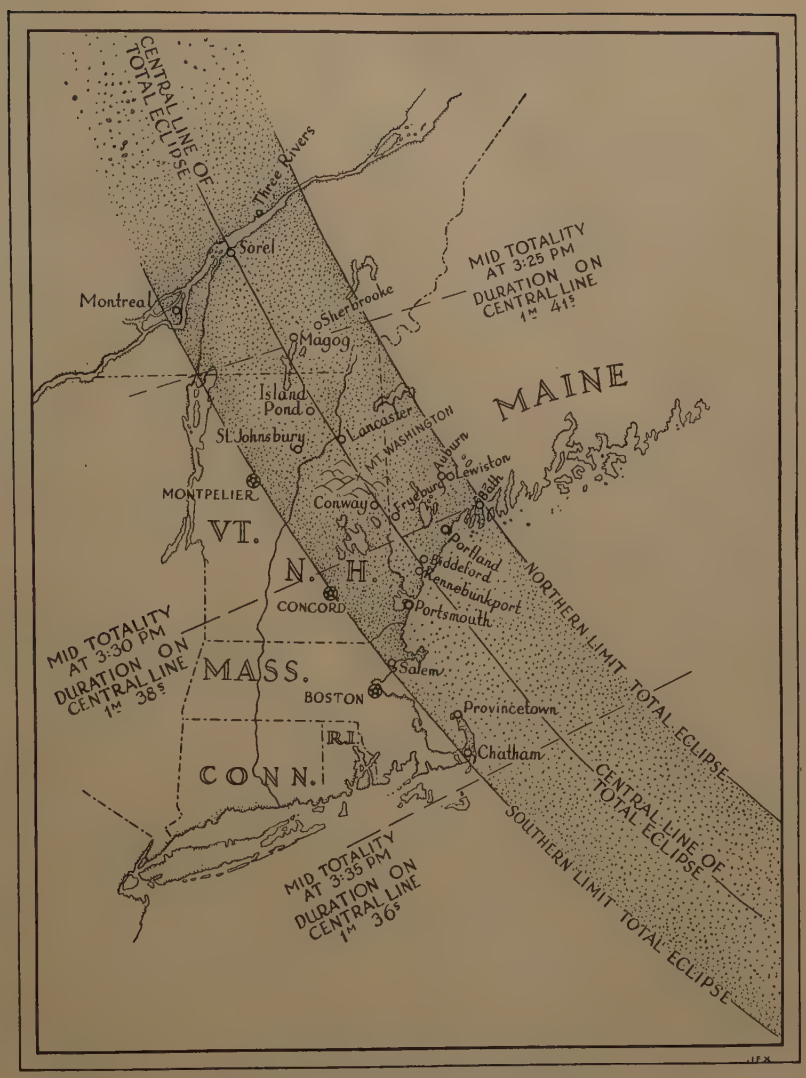
A snowbank, therefore, is an interesting place for plant study, since near it plants will be in various stages of development. They will be growing under favorable conditions, lower down, and under unfavorable conditions near or under the snow. A big snowbank low on a mountain may delay the growth of spring plants so they actually appear in autumn.

Ordinarily only a few species of plants will be found near such snow mass, but they will be prolific, abundant in numbers, and very thrifty by virtue of the location.

THE SOLAR ECLIPSE OF AUGUST 31

WHERE AND HOW TO OBSERVE IT AND WHAT IT WILL LOOK LIKE

BY ISABEL M. LEWIS



THE PATH OF THE ECLIPSE

ONE of the most impressive and awe-inspiring of all celestial phenomena, a total eclipse of the sun, is to take place on August 31 in New England and Canada. If weather conditions are favorable, and there is a little better than a fifty-fifty chance that they will be, this event should be observed by several million people.

On that day the moon will pass directly between the earth and sun, and its shadow, first striking the earth at sunrise in the Arctic Ocean, will pass at the terrific speed of more than half a mile a second across Baffin Land, Hudson and James Bays to the Province of Quebec; thence across the St. Lawrence River to northern Vermont, New Hampshire, the New England coast from Salem, Mass. to Boothbay, Me., and Cape Cod from Chatham to Provincetown. After leaving the coast it will speed onward over the Atlantic Ocean, passing about 200 miles north of Bermuda to a point in about Latitude 28½ degrees North and Longitude 41 degrees West, where it will leave the earth at sunset. It will pass over the entire path in almost exactly two hours.

A partial eclipse, the size of which will depend upon the distance from the path of total eclipse, will take place all over North and Central America, the extreme northern part of South America, the West Indies and much of the North Atlantic Ocean. The total phase of the eclipse will occur about 3:30 P.M., Eastern Standard Time, in Maine, and about six minutes earlier on the St. Lawrence River. The southern limit of the path of total eclipse will pass through the western suburbs of Montreal, a mile or so east of Montpelier, Vt., through Concord, N. H. and Salem, Mass., and about two miles west of Chatham on Cape Cod. The northern limit of the path will cross the St. Lawrence about forty-five miles southwest of Quebec and will pass over Rangeley and Boothbay, Me. The central line of total eclipse, on which the duration of totality will have the maximum value of about 100 seconds, will be the most favorable location for observing the eclipse.

All eclipse expeditions, and it is believed there will be about a score from this country and abroad, will choose sites, whether in New England or Canada, within fifteen miles or less of the central line. This line, which is the track of the axis of the shadow-cone of the moon across the surface of the earth, will cross the St. Lawrence about ten miles east of Sorel, at the mouth of the Richelieu River. It will pass two miles west of Magog, P. Q., where one of the British expeditions will be located; two miles east of Island Pond, Vt.; two miles east of Lancaster, N. H.; one mile east of the summit of Mt. Washington; two miles east of North Conway, N. H.; three miles west of Fryeburg, Me.; four miles west of Biddeford, Me., and two miles east of Kennebunkport.

Provincetown, Mass., will lie about forty miles distant

from the central line. Since weather prospects seem most favorable in inland Maine, many expeditions are choosing sites for eclipse camps in the vicinity of Fryeburg. A second British expedition plans to locate on Douglas Hill about thirteen miles east of the line and other expeditions at North Conway, Conway and Center Conway. Although it is hoped that some expedition will undertake to observe the eclipse from the summit of Mt. Washington this site is not particularly approved because of risk of unfavorable weather conditions. Reports indicate that clouds are apt to gather around the summits of the higher peaks of the White Mountains which would otherwise be favored above all other locations because of the transparency of the atmosphere at high elevations. In addition the approaching shadow of the moon is more apt to be seen at high elevations. Few people have ever seen the approach of the shadow because of the enormous velocity with which it approaches —more than half a mile in a second. It will come from the northwest and totality will begin with its arrival. After the total phase, if one is fortunate, he will see it speeding away to the southeast. The downward sweep of the shadow upon the observer has been described as almost terrifying by those who have seen it.

The shortest distance from the center line to the nearest points on the limits of the path is about fifty-one miles in New England. The duration of totality on the central line will range from 101 seconds near the St. Lawrence to 98 seconds on the Maine coast. A distance of five miles from the center line will bring a loss of only one-half a second in the duration, and at twenty miles from the center line the decrease in the duration of total eclipse will be only about eight seconds. As one gets near the limit of the path the decrease in the duration becomes rapid. At Provincetown, for example, forty miles distant, the total phase will last only about one minute. At Chatham, Mass. which is only about two miles inside the southern limit the duration will be about thirty seconds. A change of a mile here means a change of ten seconds or so in duration. It is advisable, then, for those who wish to see the most of the eclipse to get as near the central line as possible.

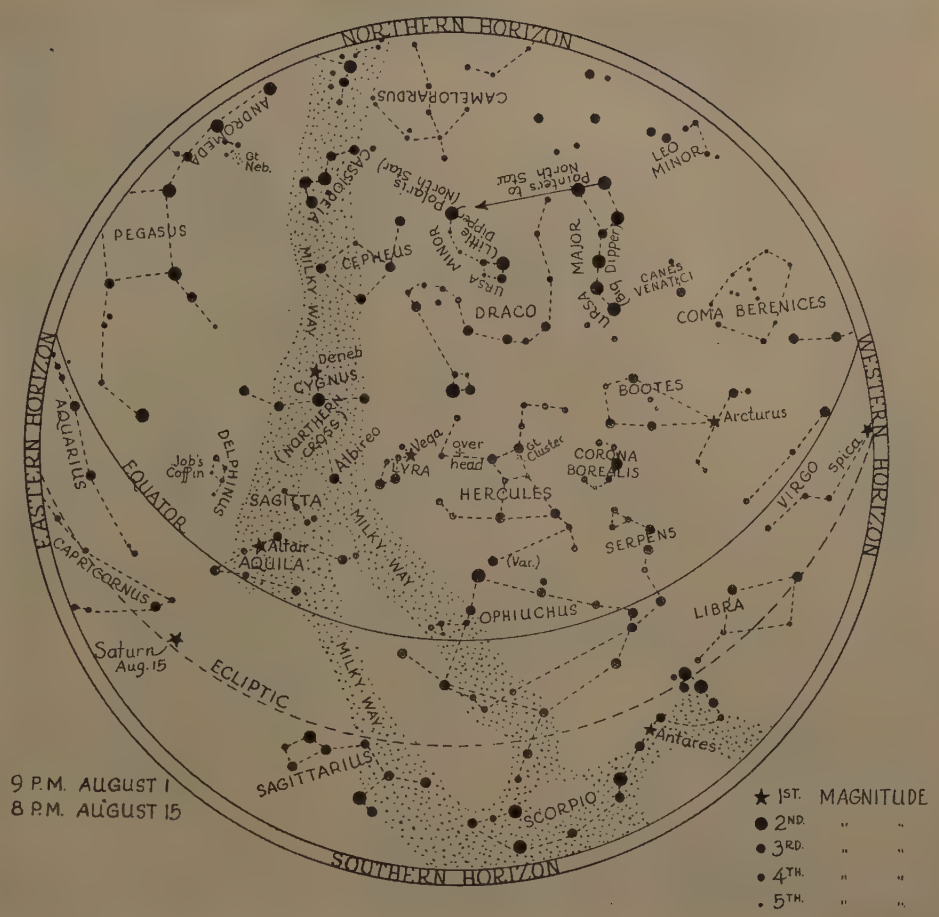
The calculated position of the path, as determined by the Nautical Almanac Office of the U. S. Naval Observatory, will probably be found to be correct within less than a single mile and the times of beginning and ending of total eclipse correct within one or two seconds. How much the calculations are in error, due to uncertainties as to the exact position of the moon, will be determined by observations of the exact time of beginning and ending of the total phase of the eclipse. Also observations of the eclipse made by those living near the limits of the path, as at Concord, N. H., Salem, Mass., and Boothbay, Me., will show exactly where the true limit of the path lies. If one is located exactly on this line he will see the sun completely covered by the moon for only an instant and he may also at the same moment see the phenomenon known as Baily's Beads. This is the name given to the bead-like points of light produced by the light of the sun shining through the valleys along the irregular edge of the moon, while the adjacent mountains have already shut off light from the nearby parts of the solar disk. Baily's Beads are also seen within the path of total eclipse. Immediately before the eclipse becomes total the rapidly narrowing crescent will break up to form Baily's Beads. Their appearance again at the opposite edge of the moon indicates that the total phase is ending.

The partial phase of the eclipse will begin generally about one hour before the total phase begins. "First contact", as it is called, occurs when the eastern edge of the moon first encroaches upon the western edge of the sun. There is little to observe during the early stages of the partial phase except the gradual advance of the moon across the face of the sun from west to east. Those within the path of totality are advised not to tire their eyes by attempting to observe this phase of the eclipse for any length of time. Of course, no one should endanger his sight by attempting to look at the sun directly without the aid of dark or smoked glasses even just before totality, when the solar crescent is very thin. It is sufficient to satisfy one's self that the eclipse is "on" and await the later and more interesting time when, about twenty minutes or so before totality, the solar crescent becomes extremely thin and the landscape begins to take on a strange, unearthly hue. Then one should begin to look for shadow bands. It would be well to spread a sheet upon the ground as they are more readily seen against a white background. They will appear faintly, at first, as dancing bands of light and shade and it will be of scientific interest to observe the direction in which they lie, the distance between the dark bands, their speed and the direction in which they are advancing across the ground. Note also if they disappear at the beginning of totality or if they are seen during the total phase. They should appear also immediately after totality. Note for how long they may be seen after the total eclipse and if their appearance and direction of motion is the same as it was before. Shadow bands are generally believed to be an atmospheric effect produced by the shadows of surface air currents, but, according to an article by Dr. W. J. Humphreys of the U. S. Weather Bureau, who made a study of the many observations of shadow bands obtained at the total solar eclipse of January 24, 1925, there are some facts concerning them that require further investigation.

As totality approaches the shadow bands increase in distinctness. The surrounding country is now becoming noticeably darker with great rapidity. The light and coloring of the landscape is unreal, unlike that observed at any other time. A hush of expectancy and awe falls over all. Talk becomes subdued or ceases. Birds and animals show a strange uneasiness. Beneath the trees appear weird, crescent-shaped shadows as the light of the rapidly thinning crescent of the sun filters feebly through the leaves. The brighter planets and stars begin to appear.

Jupiter, close to the sun on the northwest, will be the

first to appear; then Mercury, considerably more distant, also to the northwest of the sun. Between Jupiter and Mercury will appear Regulus, the first magnitude star in Leo. If one is at a high elevation and the atmosphere is exceptionally transparent the corona, that rare outer gaseous envelope of the sun that is to be seen only in connection with a total solar eclipse, and which astronomers sometimes travel thousands of miles to observe, may appear even before the sun is completely covered by the moon. At the time of the total solar eclipse of January 24, 1925, the writer and others on Mt. Beacon on the Hudson at an elevation of 1400 feet saw the corona fully 20 seconds before the eclipse became total. Yet at Honey Lake, California, at an elevation of 4000 feet, the corona was not seen at all during the 1.4 seconds of total eclipse. This may have been due to the fact that the eclipse was observed through thin haze. A remarkable display of Baily's Beads was seen and photographed at this eclipse, however.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

One feels that words cannot do justice to the mysterious, ethereal splendor of the corona. Its pearly light, contrasting vividly with the rose-colored flames of the gaseous solar prominences, which are generally to be seen protruding beyond the lunar disk at different points, often extends to a distance of two or more solar diameters in the form of long streamers. The shape of the corona is never the same at any two eclipses but its general form varies with the sunspot period. At a sunspot maximum period the corona is more evenly developed in all directions and the streamers in the equatorial regions of the sun are not so pronounced as they are at a sunspot minimum period such as we are now entering upon. At sunspot minimum the corona may be expected to have long equatorial streamers and short bushy rays curving sharply to either side of the solar poles like lines of force from a magnet. This should be the general form of the corona at the August eclipse.

Those who are skilled in drawing may wish to make a drawing of the corona. As the time of totality is limited to about 100 seconds at the most a group of several observers might find it a good plan to work together by assigning a different quadrant of the corona to each one and later form one composite picture showing details in the form of the corona and principal prominences. A disk representing the moon covering the eclipsed sun should be prepared in advance and the quadrant to be drawn by each decided upon. Reproductions of photographs are generally disappointing because they show little of the wonderful detail in structure of the corona. Those who live near the northern and southern limits of the path of totality will perform a service of real scientific value if they will carefully note whether or not the eclipse is total in their neighborhood. They should notice whether Baily's Beads are seen and whether the sun is completely covered by the moon, and, if so, for how long. Accurate observations of the time of beginning and ending of totality are also of real scientific value.

One should record his observations of the eclipse immediately after it is over before discussing it with anyone else, noting the time of (Continued on page 93)

THE SCRUB PINE

IT HAS LITTLE TO RECOMMEND IT

BY L. W. BROWNELL

PHOTOGRAPHS BY THE AUTHOR

THE scrub or Jersey pine, *Pinus virginiana,* is the weed of the pine family. It grows rapidly, spreads with ease, and has practically no value, except as a "cover tree" to protect tender saplings of more worthy trees during the first years of their growth.

As an ornamental it is hopeless, because of its scraggy outline and coarse foliage. Its small stature renders it of little worth as a timber tree, especially in the northeastern part of its range, and farmers dislike it because of the manner in which it races over their fields unless restrained by constant diligence.

It is distributed from Long Island southward along the Atlantic Coast to central Georgia and northeastern Alabama and westward through eastern and middle Tennessee to Arkansas and southeastern Indiana. It seldom grows more than forty feet in height and eighteen inches in diameter in the North, although it sometimes reaches a diameter of three feet and a height of one hundred feet in the low hills of southern Indiana.

The leaves are borne in clusters of two with thin sheaths at the base that are not more than a third of an inch long. These are light green at first, but turn to a dark brown as they gradually thicken and shorten with the growth of the leaf. The leaves themselves are twisted, rather stout, soft and flexible, and are about one twelfth of an inch wide and from two to three inches long. They have quite a strong fragrance of balsam and are persistent on the tree for three or four years, as in several other pines.

THE WEED OF THE PINE FAMILY

It rapidly spreads over farm lands, and is most common on New Jersey's Pine Barrens

Both the staminate and ovulate forms of the flowers, which appear in April and May, are borne on the same tree. The staminate flowers appear in crowded clusters at the base of the growth of the season, and are one third of an inch in length, oblong in shape and of a pale orange at maturity. The ovulate forms grow solitary, or in pairs, near the middle of the new growth. They are about the same length and are a pale green tinged with rose.

The fruit requires two years to mature, and grows erect upon the branches with no stem, or, occasionally, an extremely short one. It is an oblong, spiny green cone from two to three inches long. The seeds are pale brown, winged and about a third of an inch in length.

While the bark of the trunk is a dark reddish brown with shallow fissures, that of the limbs is greenish brown and smooth. The branchlets are slender, tough and extremely flexible.

The tree is common in the Pine Barrens of New Jersey, where the sandy or stony soil is to its taste. It can always be found on abandoned and worn-out fields and cut-over or burned-over areas. There it quickly covers many a place that would otherwise be desolate. So, after all, this coniferous weed serves to provide cover on hostile lands.

THE FRUIT AT ITS MATURITY

The cone scales are thin, flat, thickened at the apex, and terminate in a sharp spine

NATURE RAMBLES WITH UNCLE DICK

Bill Finley is the Field Naturalist and Wild Life Photographer of Nature Magazine's staff. He has had many wild pets, whose lives he has studied and of whom he has taken pictures. In this and coming issues of Nature Magazine, Bill will tell Uncle Dick about these pets and he will pass the story on to you.

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THREE LION KITTENS

"You know," said Bill, "there is a lot of fun in opening boxes."

"Yes, indeed," I replied. "And I suppose you have had a lot of them to open?"

"Quite a few," he nodded. "I remember one that arrived at my door one day. It was large and it was silent. Of course, most boxes are silent, but I had become used to boxes that are noisy."

"What do you mean?" I asked, puzzled.

"Well, you see," Bill smiled, "people have gotten in the habit of sending me wild pets to take care of. I can never tell what is inside. Often, however, I can hear it. Well, this day the box was strangely quiet. While I was prying off the top the family stood around wondering. So was I. Off came the lid. We looked in and—"

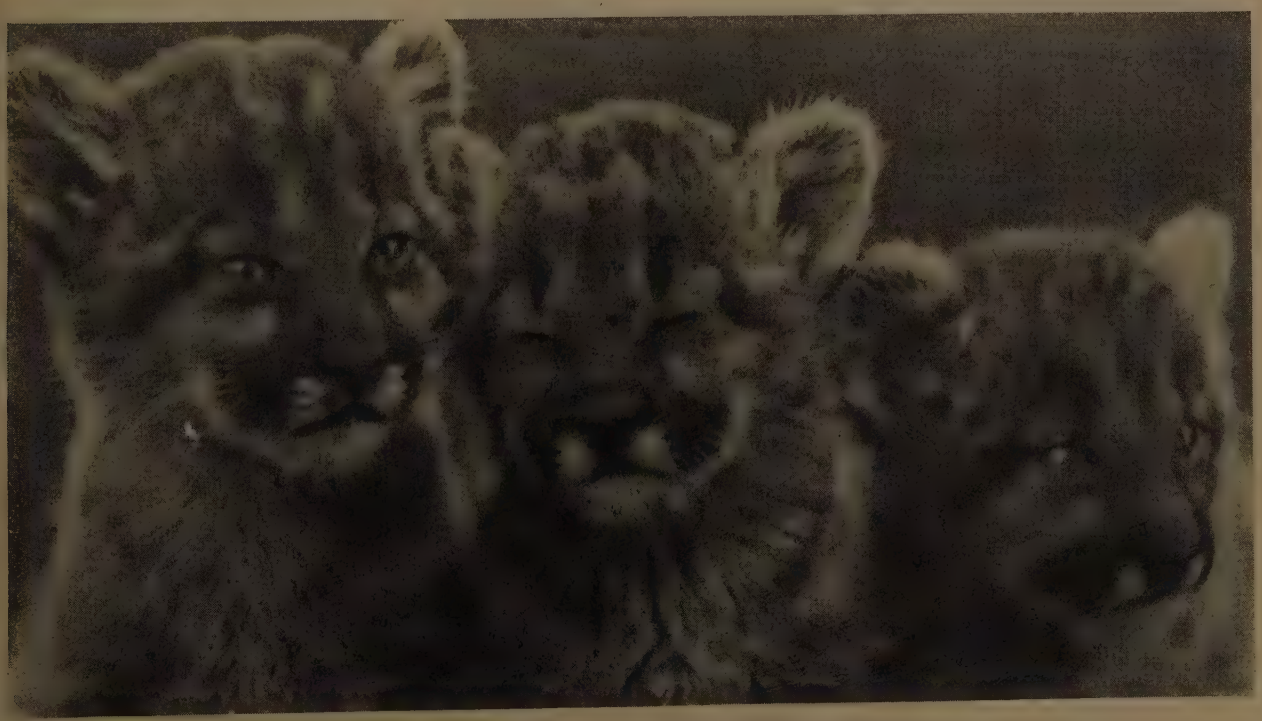
"It was empty," I interrupted, thinking that the animal or whatever had been in the box had escaped.

"No indeed. There were three cats in it. They were really kittens, but as big as cats. They were a yellowish-brown with dark spots mixed in. They had big paws. Their chins were white. Under their wet noses the fur was black, like a mustache. They had long whiskers."

"Foreign cats?" I asked.

"No," Bill said, "baby mountain lions. Some call them cougars or panthers or pumas. And they were hungry. They took one look at me and opened their mouths. I expected them to say 'meow'. Instead they sounded as though they had bad colds in their throats. The noise they made was half wheeze and half wail. A hungry baby mountain lion sounds as though it were in pain, and maybe their empty tummies did hurt.

"So the first business was food. We got a bottle of milk and put a nipple on it. This was something new to the babies. But they could smell something that seemed to be dinner. We opened one mouth and slipped the nipple in. The kitten got the idea



and started to suck. His brothers crowded in and we had to give each his turn. Soon there were three round, full yellow-brown babies, and three happy kittens ready for sleep."

"How long did you have them?" I asked.

"They stayed with us two months," Bill replied. "And we had loads of fun with them. They were different from the bear cubs. The kittens took turns with the bottle without fighting. When they were big enough for a pan of milk they would lap out of it happily together. They had nice dispositions and never seemed to get angry. They loved to be petted and would purr at a great rate."

BILL FINLEY GOES UP A TREE TO PHOTOGRAPH A MOUNTAIN LION

"That is strange, isn't it," I said, "when you realize that the mountain lion is the biggest cat in America?"

"Yes," Bill replied, "that is true. But the mountain lions are not bad cats. You hear stories of their killing people. Few of these are true. Of course the mountain lion is big and powerful. But he will go his way and let you go yours if you leave him alone.

"However, these kittens stayed with us and became members of the family. They seemed to forget that they were wild. They loved to play with us and with each other. And they were smart. It seemed to me that they understood us better than we understood them. They seemed to know kindness quickly. And, at the same time, were quick to sense danger."

"It is too bad you could not have kept them longer," I said.

"Yes," said Bill, a little sadly. "I surely didn't want to let those kittens go. I wanted to find out whether they would have always been tame and friendly, or whether they would have turned out to be wild cats. But I like to remember the little fellows the way they were."

Just then Don Q, the pet California quail that Bill had raised from a tiny, homeless baby chick, flew down from his perch on the curtain rod and lit on Bill's shoe. But that is another story.

• • •

THE DRAGON FLY

Heigh, Ho! Away we'll go
On the back of the Dragon Fly;
We'll race with birds and fleecy clouds
Across the endless sky.

The Dragon Fly was a water nymph;
Now isn't that a shame?
But he grew himself a pair of wings
And makes a fine airplane.

He's on his way to meet a friend
He's taking us to see;
So come, let's all go on a hunt,
To see where it might be.

Puzzle: Find the Dragon Fly's neighbor, the Rabbit.

THE SPIDER MAY HAVE SIX OR EIGHT EYES, BUT SHE NEEDS ALL OF THEM BECAUSE SHE SEES POORLY

MASTER SPINNERS

SOME OF THE WONDERS OF SPIDERS AT WORK

BY UNCLE DICK

PICTURES BY R. BRUCE HORSFALL

THE SPINNING MACHINE OF THE SPIDER WITH WHICH SHE CAN MAKE DIFFERENT KINDS OF SILK

SOME STRANDS HAVE STICKY BUBBLES ON THEM TO CATCH THE INSECTS

How well do you know spiders? Now don't be silly and tell me that you don't like spiders. If you do I will know the answer to my question. I will know that you don't know about spiders, and the wonderful things that they can do, and how much real value they are. I can't tell you here all about spiders. But after you read this I hope you will find the time to watch quietly and see Mrs. Spider at work. These are some of the things you might see. There are many others you should see.

There are, of course, many different kinds of spiders. Among the spinners you will find the pink, brown and white garden spider; the autumn spider dressed in rich black velvet trimmed with bright yellow; the tent makers that build fairy tents on the lawn; the house spider; the fliers; the water spider; the trap door spider and many others.

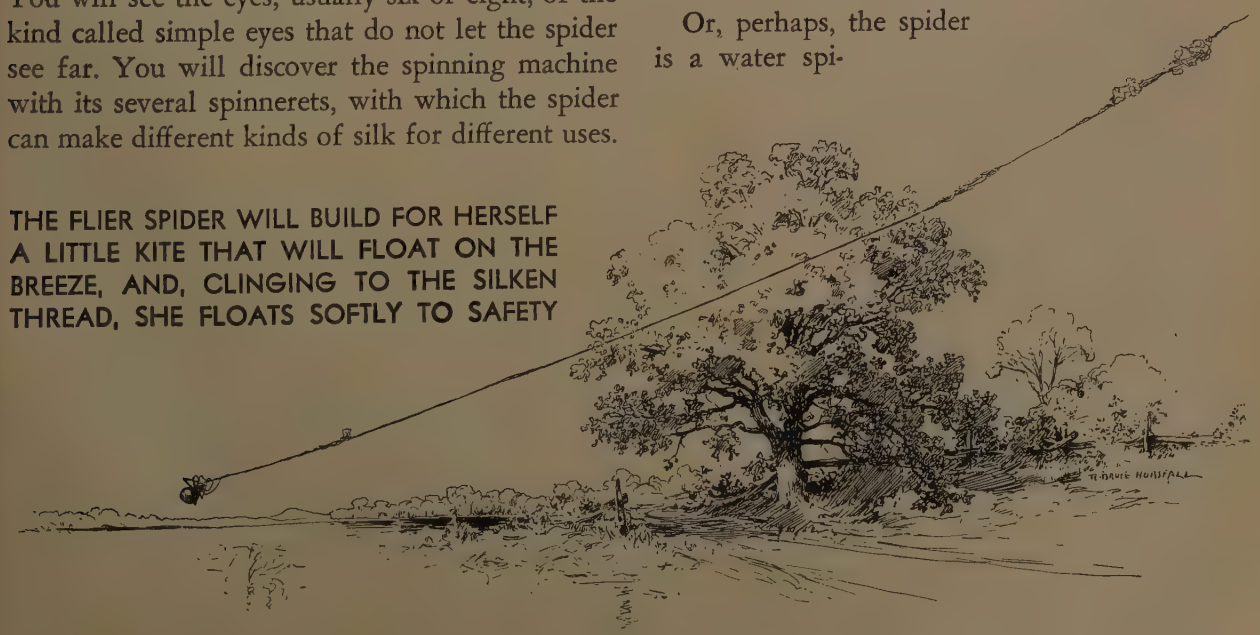
If you look closely you will find that these clever little spinners have eight legs. The legs are made up of seven pieces and have on them hairs that are used for different things. You will see the wonderful claws that are used in spinning. You will see the eyes, usually six or eight, of the kind called simple eyes that do not let the spider see far. You will discover the spinning machine with its several spinnerets, with which the spider can make different kinds of silk for different uses.

Looking closely at the web you will find that some of the threads have little bubbles of something sticky on them to catch insects for Mrs. Spider's dinner. You will find many more marvelous things, although you will have to use a magnifying glass to find some of them.

Suppose this should happen to one of the flier spiders. Suppose a pole were stuck up in a pond and on it was one of the fliers. What would she do? Would she stay there and starve? No, indeed. Right away she would plan means of escape. First she would spin a web several inches long and hold to one end while the web floated in the wind. She would be hoping that the other end would strike some object on shore and stick. But if this did not work she would have another way.

Up to the top of the pole Mrs. Flier would go. She would set to work making a kite that would float in the breeze. She would work until she had one that would hold her weight. Perhaps she might have to build two or three before she got it right. But when she got it right she would let the breeze catch it, would cling to one end by a thread and float off to shore.

Or, perhaps, the spider is a water spi-



THE FLIER SPIDER WILL BUILD FOR HERSELF A LITTLE KITE THAT WILL FLOAT ON THE BREEZE, AND, CLINGING TO THE SILKEN THREAD, SHE FLOATS SOFTLY TO SAFETY

THE WATER SPIDER DIVES RAPIDLY DOWN TO HER NEST UNDER THE WATER. HELD BY HAIRS OF HER LEGS ARE LITTLE BUBBLES OF AIR. THESE SHE WILL RUB OFF IN HER HOME AND LEAVE AIR IN IT INSTEAD OF WATER. SHE LAYS HER EGGS IN THE NEST.

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WONDERFUL IS THE TRAVEL OF THE SPIDER THROUGH THE SUMMER AIR. YOU LOOK TO SEE TO WHAT HER THREAD IS TIED AND FIND THAT IT IS TIED TO NOTHING. TRULY THE SPIDER KNOWS HOW TO FLY A KITE AND JUST HOW HEAVY TO MAKE IT.

der. She is another wonderful spinner. She builds her nest under the water. And this is what happens. She jumps into the water and walks down the stem of a water plant growing in the pond. Looking about she chooses the place for her under-water palace. A number of strong lines are built for anchorage. Then in the middle of these she builds her web. It is shaped like a thimble, open end down. Of course it is smaller than a thimble.

But when the nest is built it is full of water. Now here is a problem. She cannot pump it out the way men do from a diving bell. She has a more wonderful way. She goes up to the surface of the water. Then she plunges quickly in and down to her web. Little bubbles of air stick to the hairs on her legs. Entering the bell of her home she carefully rubs these off. Doing this again and again, she finally has air instead of water in her home. Then she crawls in and, head downward, goes to sleep for the winter. There she waits until spring again calls her to the surface to feed on flies and other insects.

I could go on and on telling you more wonderful things about spiders. But I want you to discover some of these for yourself. If you want to know a most interesting book about the spinners among the spiders just send a note to Uncle Dick and he will tell you what it is.

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ANSWERS TO JULY QUESTIONS

1. No. A bat is a mammal.
2. No. Birds today have no teeth.
3. The jaguar, a spotted cat found in Central and South America.
4. Ducks, geese, flamingos, herons often sleep standing on one leg.
5. They go to sleep in a den or hibernate.
6. The cardinal.
7. No. The whale is a mammal.
8. The condor.
9. Yes.
10. Helena's humming bird of Cuba.

SOME MORE QUESTIONS

Copy these on a piece of paper and find out the answers. Then save them until next month's issue of Nature Magazine.

1. What is the smallest owl?
2. Where does it nest?
3. Can any insect bore through metal?
4. Which one?
5. What is Mars?
6. Is there such a species as a hoop snake?
7. Can you name three wild flowers that should be protected?
8. What is a pearl?
9. Does a ptarmigan change color?
10. Name a mammal that changes color.

THE ALATAMAHA SECRET

LOST TREE OF GEORGIA SWAMPS STILL HIDES AFTER CENTURY AND A HALF

BY CHARLES NEWTON ELLIOTT

A UNIQUE character of the plant world is native to the Alatamaha swamps of southern Georgia. It possesses the characteristic of living like a hermit, in one spot, and of living there hidden from the eyes of the world for one hundred and fifty-five years. During the last twenty years botanists and naturalists have made a thorough search for it—in vain. Several years ago an expedition composed of members from the Smithsonian Institution, the United States Forest Service and the Forest Experiment Station in Asheville made an exhaustive hunt of the swamp but failed to locate this species of tree.

The tree was found by William Bartram, whose father was Royal Botanist to King George III of England and who also was an eminent botanist of his day. Bartram came over from England in 1773 and traveled through the southeastern states for five years, during which time he recorded many interesting facts about the flora and fauna of the southern states and made a wide collection of plants.

GORDONIA ALATAMAHA

Dr. Ben W. Hunt and his scion of the tree Bartram found on his estate in middle Georgia

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THE GRACEFUL FRANKLINIA

To give it the popular name. Its blooms are handsome

Bartram records in his *Travels* the discovery and naming of this tree: ". . . I employed myself in revisiting the several districts of Georgia . . . where I noted the most curious subjects: collecting them together and shipping them to England. I had the opportunity of observing the new flowering shrub, resembling the Gordonia. On first observing the fruitification and habit of this tree, I was inclined to believe it a species of Gordonia; but afterwards, upon stricter examination, and comparing its flowers and fruit with those of the *Gordonia lasianthus*, I presently found striking characteristics abundantly sufficient to separate it from that genus and to establish it at the head of a new tribe, which we have honoured with the name of the illustrious Dr. Benjamin Franklin, *Franklinia alatamaha*. . . . This very curious tree was first taken note of about ten or twelve years ago, at this place, when I attended my father (John Bartram) on a botanical excursion; but, it being then late in autumn, we could form no

opinion to what class or tribe it belonged. We never saw it grow in any other place, nor have I seen it growing wild, in all my travels, from Pennsylvania to Point Coupe, on the banks of the Mississippi, which must be allowed a very singular and unaccountable circumstance; at this place there are two or three acres of ground where it grows plentifully."

Cuttings from this plant discovered by William Bartram were taken to his father, who then lived in Philadelphia, where it was planted in the city park. Later it found its way down to the Arnold Arboretum of Boston. As Bartram mentioned, some of the cuttings also went to England, where they were placed in cultivation. One reached Chevy Chase, near Washington.

Botanists following Bartram determined the Franklinia to be a true Gordonia, as Bartram at first thought it to be. It was then given the name *Gordonia pubescens,* because of the pubescent or hairy undersurface of the leaf. Later the name *Gordonia alatamaha* was restored, the name referring, of course, to its habitat. It bears as its common name Franklinia, which was the scientific name given it by Bartram.

As the explorer suggested in his *Travels,* the occurrence of this species is "singular and unaccountable." It has never been found native anywhere else in the world except on these few acres in the Alatamaha swamps. It is a tree that has been hidden in the semi-tropical vegetation of southern Georgia for over a century and a half. Many more years may pass before it comes to light.

One wonders how such a plant came into existence and why it was confined to only two or three small acres on the wide face of the earth. One also wonders if the tree has waged a losing fight for its place in the plant world as the common chestnut of the mountains is now doing, or if it had just begun to live and had conquered and spread its canopies over only a small domain of a few acres when Bartram discovered it, and where so many have searched for it since his time.

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A MONUMENT TO NATURE

HOW SHE GIVES HER CHILDREN THE WILL TO LIVE

BY CARL KREBS

In the little wooded ravine of Doan's Brook, now part of the Metropolitan Park System of Cleveland, Ohio, an isolated shale cliff raises its peak crowned by a beautiful beech tree,—and thereby hangs a stirring tale.

Many years ago a little beech nut was dropped by a bird or a squirrel on top of this cliff. It was a hardy nut full of life. There were two innate forces working on the seedling; one, heliotropism, which drew the sprout towards the sky where it obtained light and air for its growth; the other, geotropism, which gravitated the root towards the centre of the earth. There is where its troubles began. The shale was too hard for the roots to penetrate, and it could not furnish moisture and food for the plant.

Though we attribute no thoughts or mind to plant life, it often has an uncanny way of helping itself out of difficulties; so it was with the roots of our young beech tree. They began to climb down the side of the cliff, picking up a little moisture and food whenever a bit of moss or leaf mould was lodged in a crevice. Down, down they crawled like the tentacles of a devil fish enveloping the rock until they reached soft, rich, nourishing ground of the forest, then dug in. The tree's future was now established. It could not only get plenty of water, which was also impregnated with different minerals to serve as food, but obtained a sound anchorage to enable it to withstand the storms of summer and winter. Thus it grew to a large beautiful tree enthroned upon the shale cliff, a monument to Nature, and to plant perseverance.

IT REFUSED TO GIVE UP THE FIGHT

Though several feet from food and water, the little plantlet fought its way over obstacles to gain life

THINGS TO THINK ABOUT

A PAGE DEVOTED TO CONSERVATION FROM VARYING ANGLES

"Common Sense" Gunning

We have for review a two-page leaflet recently issued by the Emergency Waterfowl Committee of the Massachusetts Fish and Game Association, 41 Mount Vernon St., Boston. Briefly, it is a thinly-veiled assault on the Migratory Bird Treaty Act, which, among other provisions, directs the Secretary of Agriculture to determine by what means the killing of migratory birds may be permitted. We mention this provision because the burden of the message under review protests certain restrictions that have been placed on killing practices by regulations made under this act. The act itself, however, is not mentioned by name.

We have neither time nor space to discuss at length all the points mentioned in the leaflet, but will quote certain paragraphs that seem to be among the more important.

After affectionately patting the sportsmen as law abiding conservationists the leaflet states, in part:

"The Migratory Bird Treaty gave to the Federal Government the duty of fixing the bag limits; the number of shooting days; and the time of year that such shooting may take place.

"It is a question, however, in the minds of many whether the Treaty gives the Federal Government the right to dictate the *particular manner* in which the migratory birds shall be taken.

"Whether it does or does not, apparently the entry of the Government into directing the manner of the taking has brought about mistakes that resulted in treating hundreds of thousands of gunners unfairly, engendering bitterness and heaping protests and criticisms upon officials whose problems are large enough in their ordinary day's business without having to bear all of this additional grief and trouble.

"Last year's experience has certainly demonstrated that if this new policy is continued and more of these regulations regarding methods are promulgated, as they will be if the Government attempts to control every detail, then protests, politics, and trouble are going to be our portion from now on.

"The nation-wide live goose decoy regulation was a mistake. Because some gunners in one of the Western States were using large numbers of decoys in a manner that was considered unfair towards several of the rarer species of geese, a blanket regulation was issued forbidding the use of more than ten live goose decoys anywhere in the United States—and ruined the goose gunning in New England where there was no occasion for additional protection.

"Gunners in New England are obliged to use a large number of decoys in order to stop the fast, high-flying geese that migrate over this section. And yet, despite the large number of decoys used by New England gunners, the average kill out of the hundreds of thousands of geese that fly over is only about 5,000 a season.

"The law was most unjust to the New England gunners and the local Western trouble should have been left to the State of California to control.

"The next mistake came when the Government ordered the shooting season reduced to one month all over the United States without proper consideration as to whether the shortage of waterfowl due to the drought in Western Canada affected all sections of our country alike.

"Harmony and co-operation should prevail and can prevail between the Department in Washington and the sportsmen, and the best results can only be obtained through such harmony and co-operation.

"To this end, we urge that the Government fix, in a broad way, the bag limits, the number of shooting days and the time within which those shooting days must fall; having a due regard for the number of birds available.

"We urge that every other question pertaining to the manner of taking, such as the selection of the month or months; the number of live decoys that may be used; whether to have rest days or not; baiting; automatic guns; and other details be left strictly to the various State Governments to determine.

"As a matter of fairness and common sense, we urge that this be the policy of the Government in the future. All will benefit thereby, and nobody more than the Bureau of Biological Survey itself."

In discussing this series of threats against the Government's methods of administration, its opponents seem to have lost sight of the important fact that both the Migratory Bird Treaty, and the Migratory Bird Treaty Act, which gives it effect in this country, make it plain that they contemplated the protection of the birds only; as far as the gunners are concerned, their activities are the ones to be restricted, since the birds are not the attackers. Yet no reference, and apparently no thought, is given the matter of treating the birds fairly. The poor gunners, however, and especially those of New England, are treated unfairly and unjustly. In view of the "large number of decoys" that the gunners there "are obliged to use" to stop the fast high-flying geese that migrate over that section, and the further statement that only about 5,000 are killed there each season, one is led to wonder how many of New England's thousands of wild fowlers are actually concerned in taking these few geese, and how fairly they are treating the other gunners there who cannot afford to maintain large numbers of live decoys.

When this committee urges that all matters relating to taking migratory birds be left to the States, has it forgotten that the Treaty and the Act were judged to be necessary because the States had already failed to safeguard the future of the birds that were obliged to pass through them between their summering and wintering grounds? Can we doubt that this proposal is born of the desire to pave the way for a still more destructive program of competition for the greatest possible reaping of the nation's game resources as the birds pass through? As the matter stands today, Federal protection is all but nullified by the selfishness of the States, which, incidentally, are showing little ability in protecting their resident birds, let alone the migrants.

This committee, then, would leave to the States all those features that tend to be most destructive—the dates of open seasons, number of live decoys, rest days, baiting, automatic guns and other details. Does it not foresee that unless gunners, including sportsmen, show more disposition to conserve the game, that both baiting and decoys will soon be outlawed, along with other unsportsmanlike practices? Perhaps, indeed, these developments are seen on the way, and the present effort is intended to forestall them.

The past few months have been signalized by desperate efforts on the part of various organizations to institute radical changes in legislation, ostensibly to correct conditions brought on by wasteful and selfish methods. None of these efforts, however, has revealed any disposition to further limit the kill, which we believe is the only solution, and we have faith to believe that they will fail, as they should.

We are curious to know what is meant by the final sentence in this message of advice. What is this reward that is held out to the Biological Survey, if it will surrender its authority? Is it implied that, by forsaking the trust and the duty charged to it by the Congress, it shall fall on better days?

Is it not conceivable to this committee that even a Government bureau may prefer honor to ease?

Hornaday Calls for Action

In connection with a hearing on ways and means for waterfowl protection, which was held on April 4, 5 and 6, Dr. W. T. Hornaday called on all friends of the birds to rally to their defense, and to the support of the Federal Government. Powerful interests in various quarters are intent on weakening the power of the Department of Agriculture, which is charged with the protection of migratory birds by the Migratory Bird Treaty Act, by encouraging the idea that the powers of the States have been in part usurped. Dr. Hornaday especially urges support of the following basic principles to be urged at Washington in 1932, and in this action we fully concur:

There should be *no extension* in 1932 or 1933 of the Federal thirty-day open season on waterfowl.

There should be *no increase* in any bag or season limit on killing.

Uncompromising support of Federal game protection by Congress and the Department of Agriculture must be given. It is just as necessary for ducks as food and water!

It is imperatively necessary that both the Federal government and the States should make a great many small inviolate sanctuaries and feeding stations for waterfowl, preferably on fenced farms, where they easily can be protected—and do it quickly.

Because of their deadly and destructive effects, common sense imperatively demands the stoppage of all baiting to kill, and of the indefensible treachery of luring game by live decoys of their own species.

Shocking Bears

By G. C. Ruhle,
Park Naturalist, Glacier National Park

Late in fall six years ago I made a fishing trip into the Hetch-Hetchy region of Yosemite National Park. At the foot of the reservoir stood the cabins of the laborers who had constructed the dam. Bears were there too, but all bore a disinterested, if not disgusted look even for the cabin in which hung hams, bacons, and other bruin delectables. There certainly was a reason for this curious anomaly in the state of affairs. If truth were to be told, all of the bears had been quite shocked into a remarkable respect for the integrity of the cabins. Wire screens and special metal protective strips around doors and other openings had been connected to high potential sources of electricity. In earlier days, each expectant bruin, foraging about for a lickerish prize, had touched a wet nose to these shocking devices to complete a circuit to the earth, to receive the extreme surprise of his life. Without exception, every bear exhibited a thoroughgoing and permanent disapprobation of the sensation. Glacier Park road and trail camps have always been seriously annoyed by prowling bears. Cognizant of the effectiveness of the above, window openings last year were crossed and recrossed with steel bars, frail indeed, but connected with a deterrent series of batteries. The palliative has been most successful. One shock is always enough to send bruin precipitantly and permanently back to his most secluded retreat.

Tularemia Warns

All our eastern states south of Maine are abundantly supplied by Nature with the cottontail rabbit, a creature that by reason of its ample reproductive powers and its toothsomeness is especially useful in supplying sport to the country boy and the city gunner whose degree of skill forbids the bagging of swift-flying winged game. Furthermore, it is necessary, in these thickly settled states, that some means be taken to keep within reasonable bounds the numbers of these bunnies, that their replenishing of the earth be within moderation.

In some parts of the country the cottontail is subject to tularemia, a disease that seems to have been designed by Nature to save the earth for organisms other than rabbits. Tularemia is not prevalent in our eastern states, and a few years ago we had occasion to warn against the importation of rabbits from states where it is endemic, as a protection for our native stock, and also for our hunters and their families, for the disease is transmissible to human beings and is often fatal.

Importation of rabbits from the West is not necessary, as a little moderation in killing will leave each year a sufficient breeding stock to replenish the covers.

But the warning spread by NATURE MAGAZINE and others has not always been heeded, and in several cases diseased cottontails have been detected just in time. The latest instance that has come to our notice concerns a shipment of rabbits received by a sportsmen's association of Fairfield County, Connecticut. Discovery of the dread disease resulted in the timely destruction of the entire shipment, and the Game Commissioner has decided that no more permits for the introduction of rabbits will be issued.

Photographing a Rare Ram

One of the Panamint Valley rams mentioned by Vernon Bailey in his article on bighorns in November NATURE MAGAZINE has had his picture preserved for posterity. Miss Inness P. Brokaw of Los Angeles was the photographer, but she caught him in a characteristic pose, not amid the peaks, but in the yard of an Indian home, to which two of the rams had followed a goat herd in the hopes of forage. The period was one of extreme drought, and the sheep evidently could not find enough to eat in their mountain fastnesses, so came down to "civilization". The ram posed perfectly for the first picture, but lowered his head and charged just as the second was snapped. The Indians did not seem to care for the picture-taking, either, and tried to prevent Miss Brokaw from photographing one of the women weaving baskets. The photograph was taken just north of Balarat and near the foot of the lower ridges surrounding Telescope Peak.

Transplanting Trilliums

Mrs. John Post Miller of Oswego, New York, is fortunate enough to have a farm near Oswego with which, she says, she "plays" in the summer. The farm, in turn, has a large number of trilliums growing here and there on it. Mrs. Miller has experimented interestingly on naturalization of these lovely wildings, bringing them into her city garden. She writes that she has transplanted them to a garden in the front of the house where they get only the early morning sun; on another side of the front piazza and in under the shrubs. They have prospered in all three places and in soil of different quality. These results testify to the hardihood of the trilliums and to Mrs. Miller's understanding care in transplanting them.

More Redwoods Saved

Depression or not, the movement to save the coast redwoods of California and southern Oregon goes on successfully. The latest addition to the redwoods preserved for posterity consists of 4892 acres of forest in the Prairie Creek region of northern Humboldt County, California. This brings the total acquisition in this section to about 6000 acres, representing a value of about one million dollars. The latest large purchase was made possible through the contribution of $500,000 by Edward S. Harkness of New York. Private gifts and $150,000 from the State Park Commission completed this important purchase.

A Wistful Chap

By Bernard Corbyn Adams

I was very much struck the other day, while strolling through the London Zoological Gardens, with the similarity to some human beings of a little brown monkey. This young fellow was seated on a fallen tree trunk with his chin propped upon his two little closed hands. He was gazing out across a stream of water which was situated on the border of a stretch of woodland opposite his enclosure. He stared with a melancholy and wistful air as if thinking of the playmates he had left behind in some distant playground or else of the vicissitudes of the life he was leading. I stepped in front of him to attract his attention but instead of taking any notice of me he leaned quickly to one side to continue his musing. When I persisted in blocking his view however, he finally looked up at me with the same melancholy air as much as to say, "Why do you persist in making trouble for me?" The expression of his eyes is still with me and, needless to say, I stepped aside to let him muse all he wished, leaving the gardens with the feeling that he was the only chap there whom I understood.

Rocky Mountain Notes

Edmund B. Rogers, superintendent, and Dorr G. Yeager, park naturalist, are certainly to be complimented on the achievement of the monthly Nature Notes from Rocky Mountain National Park. Accustomed as we have been to the mimeographed (on both sides) Nature Notes with which most of the park naturalists have had to content themselves, we admit to having wondered how Ed and Dorr managed this. Now we find, from the last issue of the Notes, that *The Estes Park Trail* does the printing for nothing and we doff our hat to that estimable newspaper. The April issue of Grand Canyon Nature Notes was the first to appear lithoprinted through the agency of the newly-formed Grand Canyon Natural History Association. It makes a most attractive presentation in this form, and people who have visited Grand Canyon should welcome the opportunity to join the Association at one dollar a year and receive the Notes regularly. Write to E. D. McKee, Park Naturalist, Grand Canyon, Arizona. We hope that some day all the other parks will be able to print these publications because they have a value that we sometimes suspect is not generally realized.

A Clever Bee

Oliver O. McVeagh of Oil City, Pa., writes that in his yard he has a large bush of *Rhododendron viscosum,* also called *Azalea viscosa,* and known popularly as swamp honeysuckle or white azalea. Knowing that the long tubular corollas of the flowers were such that a bumblebee could not reach the nectar, Mr. McVeagh was surprised to find a bee busily working about the bush. He investigated and discovered that the bee was piercing a hole through one side of each blossom about one-eighth of an inch from the bottom of the corolla, thus removing the nectar with ease. Some of the blossoms that had been punctured several days before had started to decay around the hole, and small bees and other insects were taking advantage of this opening for themselves.

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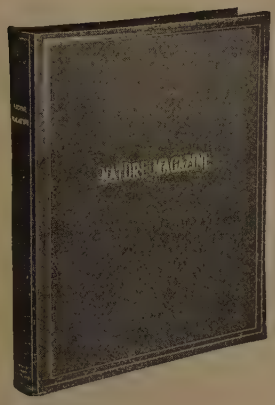

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THE SOLAR ECLIPSE

(Continued from page 83)

appearance and disappearance of shadow bands, particularly the direction in which they lie and their direction of motion over the surface of the earth. Note time of beginning and ending of totality as accurately as possible, and if Baily's Beads are seen, make a rough sketch of form of the corona and position of conspicuous prominences. Note whether it is possible to read the hands of a watch or print during totality. Totalities differ greatly in degree of darkness. Note if shadow bands are seen at all *during* totality. If you make all of these observations carefully, particularly at high elevations, your results may be of considerable scientific value. We would like to urge all who make observations on Mt. Washington to take particular pains to record the result of their observations. The fact that weather predictions are not particularly favorable for Mt. Washington will probably keep any scientific expedition from going there. Also anyone living far north in Canada will be in a position to make very valuable observations and if the eclipse should occur in a clear sky he should attempt to photograph or draw a sketch of the corona and make all other observations possible. The farthest north expedition, so far as is known, is that of the Dominion Observatory at Ottawa which will be located at Parent, P. Q.

Total eclipses of the sun are rare occurrences in any one locality. No total eclipse of the sun will occur again in New England until October, 1959, when the sun will rise, totally eclipsed, in Massachusetts, Rhode Island and Connecticut, but the shadow will quickly speed to sea.

There will be a total eclipse of the sun in the northwestern states and Canada in July, 1945, and again in June, 1954. On July 20, 1963, there will be a total solar eclipse of about one and one-half minutes duration passing close to the position of the August eclipse in New England. The central line will pass near Auburn, Me., and Montreal and Portland will again be in the path of total eclipse. After that no eclipse will be visible in New England until well into the next century.

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Plan For Saving Ducks

"More Waterfowl by Assisting Nature" is published by More Game Birds in America, a foundation with headquarters in New York City. Briefly, it proposes to increase waterfowl, and sport, by improving the conditions under which the birds breed and nest, both in the United States and Canada. It is proposed to finance this great project by imposing a tax of one cent on each shotgun shell.

We may at once express the opinion that the theory that game birds may be increased by the expenditure of one cent for each potential victim is superlatively fantastic. When we see the ducks increase because of a one-cent tax on each shell that is shot at them, we can be assured of saving the forests by taxing the axe and saw, and of perpetuating the whales by levying a dime or so on each bomb-lance.

The plan includes experiments in artificial production of ducks by incubator hatching of eggs taken from wild birds, and the suppression of natural enemies. The point is made that ducks formerly visited innumerable lakes and streams where they are no longer seen, and the fact that they still frequent the lakes of Central Park, New York City, and the city sanctuary at Oakland, California, is cited to show that buildings and highways do not necessarily alarm the birds. But the important fact that in these places the banning of the gun and the provision of food have made possible this confidence is not stressed.

The book has several maps, including one of the present refuges, both in the United States and Canada; one showing the open seasons as they stood before the reduction to thirty days; and one showing the principal breeding grounds in both the United States and Canada. Most of these maps seem to reflect accurately the conditions, but the one of the breeding grounds is so erroneous as to create the suspicion that accuracy has not been sought. For example—there are included vast areas in Oregon, Idaho, California, Utah, Arizona and New Mexico where we believe not one acre in a thousand is capable of producing a single duck.

Useful features are short chapters on pollution, lead poisoning, illegal trapping, coordination of government departments, and history of legislation, compiled from authoritative sources.

The sponsors of this plan for increasing waterfowl express impatience toward restrictive measures, but we hope that any increase in killing privileges will await positive evidence that the condition of the stock justifies such action. And we are far from certain that the program advocated by More Game Birds in America will in any way benefit the birds.

Yellowstone Mammals

According to the last census of large mammals of Yellowstone National Park there are 10,624 elk in the herd that summers in the Park and winters in the vicinity of Mammoth and Gardiner. In addition the count shows 2,499 elk in the herd that spends a portion of the summer in the Park and the rest of the year in the Gallatin National Forest. The census also reveals 1,016 buffalos, 700 moose, 885 deer, 668 antelopes, 180 grizzly bears, and 500 brown and black bears.

Mount Kearsarge

Lovers of the New Hampshire mountains—and who, having seen them, does not love them?—have another opportunity to save for posterity the slopes of one of the most distinguished of these heights—Mount Kearsarge. This mountain is the central dome of New Hampshire and already 1,300 of the acres on its sides are in reservation, more than half owned by the State of New Hampshire and the balance by the Society for Protection of New Hampshire Forests as a memorial to the founder of the Society, Frank West Rollins. A tract of 1,600 additional acres has been held by a lumber company for $14,000 but is now on the market for $8,000 despite the fact that it is taxed for $12,000. The present market offers an opportunity to preserve the area in a manner similar to the saving of Franconia Notch. A summer resident has already given $1,000 of the necessary $8,000 and a leading Boston business man has given thirty-five important acres on the north side of the mountain. Contributions toward the fund for Mount Kearsarge will be received by James J. Storrow, Jr., treasurer, through the offices of the Society for Protection of New Hampshire Forests, 4 Joy Street, Boston, Massachusetts.

Fooling the Starling

At last a way seems to have been discovered to keep starlings from preempting a bird house set up for flickers. The ingenious bird lover who has found the way is Shirley C. Hulse of Bedford, Pennsylvania. Observations showed Mr. Hulse that the starlings begin nesting about the middle of April and the flickers toward the end of May. Once the flicker got under way with its nesting activities the starlings could not dispossess it, but until then the starlings always had the jump on the flicker and usurped the flicker box. So Mr. Hulse bored an inch hole in a piece of beaverboard and nailed it over the hole in the flicker box. The hole was too small for the starling, but the flicker would without any trouble cut it out to full size. Mr. Hulse says, however, "I renewed the beaverboard at least six times because, while the flicker was just getting ready to move in, the starlings hung around to grab the box as soon as the hole was bigger."

Unwise Teaching

A pertinent observation is made by Gordon W. Jones of Richmond, Virginia, when he recalls that in his biology class in high school the teacher required each student to collect fifteen wild flowers for an herbarium. He adds that a friend reports that another teacher required each member of her biology classes, totalling one hundred and sixty students, to provide fifty different wild flowers each for dissection. Multiplication gives one a rather stupendous figure representing the drain of such policies upon our wild flowers, no few of which are in danger of extermination. The objective of such teaching methods is excellent but the indiscriminate order to collect wild flowers in such abundance and abandon is most ill-advised. It is to be hoped that biology teachers will be able to combine study of the structure of flowers with an appreciation of the serious need for wild flower preservation.

Appalachian Trail

Undoubtedly the greatest contribution to the hiker of today has been the construction of the Appalachian Trail, which, when completed, will extend from Maine to Georgia. The opening up of this trail has been carried forward with steadfast purposes, a strong enthusiasm and a clear vision. The achievements thus far have been in proportion. The work has also had the benefit of the advice and cooperation of a number of leaders in the field of planning and out-door architecture, especially, of course, Benton Mackaye. Mr. Mackaye may actually be said to be the father of the Appalachian Trail and, as such, particular interest attaches to his article in the recent issue of the *Scientific Monthly* entitled "The Appalachian Trail; A Guide to the Study of Nature". Space does not permit the reproduction here of any useful part of this article, but a reprint has been made and may be had by interested individuals by addressing Mr. Benton Mackaye, 56 West 45th St., New York City.

Check on Chestnuts

Still pursuing his theory that blight-resistant native American chestnut trees may be developed through the encouragement of sprouts that have appeared since the blight swept most of the trees away, Dr. John Stuart Thomson of 361 Bergen Avenue, Jersey City, N. J., again calls for voluntary cooperation in an attempt to restore this tree to its former glory. Dr. Thomson is convinced that progressive immunity can be built up for the chestnut tree and has conducted many experiments in support of his conviction. What he wishes is to hear promptly from individuals who find nut-bearing sprouts or new trees bearing burs.

Plume Hunters Active

Economic conditions and unemployment have created a condition that makes violation of the law against plume hunting in Florida both profitable and considerable, according to Dr. T. Gilbert Pearson, president of the National Association of Audubon Societies. Faced with this situation, Dr. Pearson's organization has placed two additional wardens on duty to wage war on the hunters and to protect these egrets and other birds of rare plumage from exploitation. Two additional wardens have also been appointed to protect birds breeding in colonies on islands along the coast of Maine.

Grackles Winter Well

Sunday was the important day of the week to grackles that chose to winter this year in Jackson Park, Chicago, instead of going south, according to George Collins of the Windy City. On that day such dainties as chopped steak, suet and even cornflakes were fed them by many citizens who make weekly pilgrimages for this purpose. The winter was particularly favorable to the birds, although many of them suffered severely in the March storms. Mr. Collins writes that Christmas was an unusually happy day for them, as large numbers of people came to see that they had excellent provender to mark the holiday. We are glad to see that Chicago is showing a fine conservation spirit in its treatment of wild visitors.

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NATURE IN PRINT

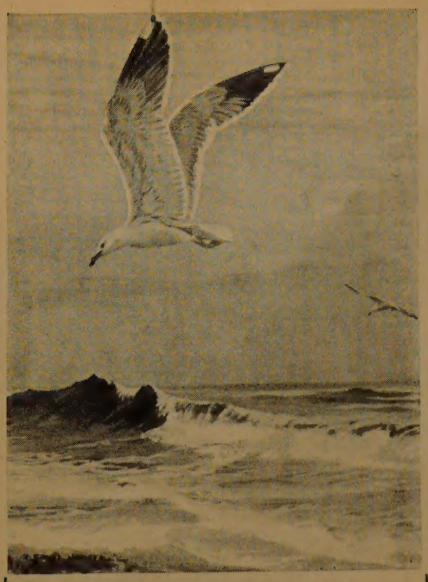
As a convenience to readers to whom book stores are not easily accessible the books reviewed in this department of Nature Magazine may be ordered through our own book department.

Nature Poetry

With appropriate sincerity and simplicity Lewis Flint gives the Nature poems, that appear in volume form under the title of *Bobolinks,* a strength often missing from attempts to express the people of the wild world in words that rhyme. This is undoubtedly a reflection of the fact that Mr. Flint knows his birds, mammals and flowers and understands the outdoors. His work is plant research with the Government, but the scientific side of him in no way hinders his ability as a poet, and Poetry Publishers of Philadelphia have, in this volume, brought out a delightful contribution to the field of Nature poetry. The list price of the book is two dollars. Also from the same publishers comes a smaller, paper-bound volume of attractive poems under the title of *Archway of Dream.* This is a collection of the poems of Elizabeth Voss, and in this little book she includes a number of Nature poems of fine feeling and thought. The price is not revealed anywhere in the book.

Washington Trees

Notably appropriate to the George Washington Bi-Centennial Year and likewise valuable as a volume of record is *Trees of Washington* by Erle Kauffman. The First President is known to have loved trees deeply and many millions have this year been planted as a memorial to him. The city that bears his name is equally noted for its trees. Mr. Kauffman, therefore, has a fertile field to work in and he takes full advantage of it. He has gathered material about Washington as a tree lover and quotes from Washington's diaries where references to trees occur. A chapter is devoted to the trees of Mount Vernon, another to the trees of the City of Washington and another to famous and historic trees. The whole volume is effectively illustrated and is published by the Outdoor Press, Washington, D. C., at one dollar.



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An Animal Book

In compass *Wild Beasts Today* by Harold J. Shepstone is different from any other wild animal book we have encountered. It ranges from the story of animals kept in zoological parks to animals protected on preserves. The author treats with the work of collecting, protecting and propagating wild life whether the subjects be behind bars in a cage or whether, as with the whale, they are protected by international treaty. This seems a rather large assignment for one book, but Mr. Shepstone has accomplished his aim with amazing success. The result is a fascinating volume, the several chapters of which are intimately related to the whole volume or could, equally well, stand by themselves. The book is profusely illustrated by excellent and carefully selected pictures, and the style is both informative and good reading. The publishers are the Macmillan Company and the book sells for four dollars.

Fighting Deer

The town of Hot Sulphur Springs, Colorado, witnessed a thrilling battle last winter, and then saved the two combatants from death. The warriors were two buck deer, who locked antlers and were unable to extricate themselves, and when found were struggling futilely and glaring at each other. Compassionate watchers, who had turned out from the town following a report of the combat, tried to separate them. The antlers could not be sprung apart, so an attempt was made to shoot them loose. This failing, the deer were thrown and tied, and the antlers were sawed apart. As soon as the animals were free, they moved about a hundred feet away, and began to fight again as if nothing had happened. Evidently neither of them appreciated how close he had come to death.

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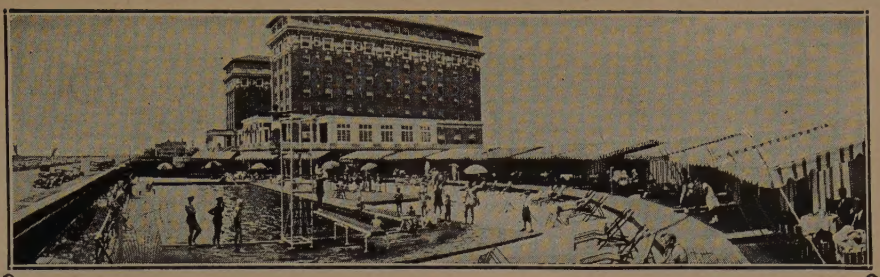

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